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## THE TREATMENT OF HOOKWORM INFECTION


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The data that we present dealing with the therapeutics of oil of chenopodium and thymol are derived from our report to the International Health Board, Rockefeller Foundation, on the subject of the effect of hookworm infection on the working efficiency of the people of the Malay Peninsula, Java and Fiji.

On account of the importance of the subject of the treatment of hookworm infection among our soldiers at this time, the accompanying data have been abstracted from the report for immediate publication. The views here expressed are based on experiments in which the number of cases was, perhaps, too small for drawing satisfactory conclusions. So far as they compare the efficiency of various vermicides in different doses, therefore, they should be interpreted as being subject to confirmation by more extended investigation, rather than as being sufficient in themselves to establish a fact. It should be borne in mind also that the experiments we conducted were carried out in hospitals, and it may be that under less perfectly controlled conditions, such as obtain in the field, certain modifications in our recommendations would be found necessary.

Our work covered a period of about two and one half years, and included observations on the natives of the Malay Peninsula as well as Chinese and such East Indians as Tamils, Telegus, Malabaris, Pathans and Sikhs.

The research was extended to the Javanese, Malays and Chinese of the neighboring island of Java. Later, in order to make some control observations, the malaria-free island of Viti Levu, in the Fiji Archipelago, was visited, and natives, as well as indentured and free Indian coolies from Calcutta, were made the subject of investigation.

We found that among natives nearly 100 per cent. of whom had hookworm ova in their feces, the microscopic examination gave us no information as to the degree of the infection; for on treatment such people were found to harbor from one to a thousand or more hookworms. Some harbored from one to fifty hookworms without exhibiting any measurable degree of anemia; others harboring from 200 to 1,000 or more worms showed evidences of measurably severe anemia in the higher worm counts. It was necessary, therefore, to know exactly how many hookworms were being harbored, in order to compare the numbers of worms with percentages of hemoglobin, and thus ascertain the number of worms required to cause a measurable degree of anemia. To this end, large numbers of persons were treated with the most powerful vermicide at our command, so as to ascertain the total number of worms in each case.

It must be emphasized that in using a vermicide, one is employing a drug poisonous to man as well as to the worm, and the object should be to narcotize the worms and expel them together with the administered vermicide as rapidly as possible to prevent injury of the host. Special attention should be paid to insuring free purgation after the postvermicidal purge has been given. It is imperative that several stools be passed within two or three hours after the administration of this postvermicidal purge. If necessary, a second purgative dose should be given.

### RELATIVE EFFICIENCY OF VARIOUS DRUGS IN REMOVING HOOKWORMS

Preliminary tests with thymol and oil of chenopodium indicated very positively that in the dosages usually recommended (thymol, 60 grains; oil of chenopodium, 48 minims, or 3 c.c.), thymol was the weaker vermicide. Our confidence in the superiority of oil of chenopodium in the earlier stages of our work was based on necropsy findings, in which we noted the number of worms found in six cases in which the patients had received the maximum dose of oil of chenopodium, 16 minims (1 c.c.) three times, and who died later of tuberculosis, dysentery, diabetes or peritonitis. The percentage of removal of worms in this small series of cases was 99.4.

We attempted to measure the relative value of vermicides by the relationship between the number of worms removed by a drug and the total number of worms present. The total number of worms was found by giving full doses of chenopodium until, as far as possible, the stools were rendered negative for ova on microscopic examination.

The experiments were carried out on batches of adult male prisoners chosen at random except for the fact that care was taken to balance the nationalities carefully and not to compare a result obtained in Chinese with a result obtained in Tamils or Malays. This precaution is necessary in view of the fact that the Chinese harbor fewer worms and a greater proportion of ancylostomes than the Tamils or Malays, in whom most of the worms are necators. Because, as is shown in our report, it is more difficult to remove ancylostomes than necators and more difficult to obtain a high percentage of worms by treatment when there are few than when there are many, it is not fair to compare results obtained in Chinese with those obtained in Tamils or Malays.

The method adopted was to administer first the remedy to be tried, and in speaking of this treatment it is useful to call it the *trial treatment*. The worms removed by this treatment were carefully collected and counted.

After this, always at an interval of at least a week, a second treatment was given of oil of chenopodium, 1 c.c. in freshly filled capsules three times at hourly intervals. This was done to test the efficacy of the previous trial treatment by discovering the number of worms left behind after that treatment. A convenient term for this treatment is the *test treatment*. After the test treatment the stools were examined for ova, and in those cases that were found positive the patients were given an *extra treatment* of oil of chenopodium, 1 c.c. three times. The stools were again examined for ova, and if necessary, further treatments were given until, as far as possible, the stools were rendered negative for ova. These examinations for ova were always made a week after the treatment was given, and in most cases more than two weeks were allowed to elapse. This procedure avoids error due to any possible latency in ova production in the early days after treatment.

The total number of worms removed was added together; the percentage of worms removed by the stools had been washed and examined. When prisoners had no stools at a washing, they were given another saline purge.

### DIFFERENCE IN VULNERABILITY OF SPECIES TO CHENOPODIUM

This was studied from the combined results of series in which oil of chenopodium was used as the vermicide (Table 1). It is seen that 96.8 per cent. of all necators present were removed by the first treatment, as compared with 76.6 per cent. of all ancylostomes. This shows that necators are less resistant than ancylostomes to a given dose of vermicide. The resistance of both species of worms increases with the size of the worm.

The species formula or proportion of *Ancylostoma duodenale* to *Necator* varies in different classes of persons. In the Southern States, *Necator americanus*, according to Dr. Stiles, is the species always encountered.

With Japanese, Chinese, North Indians, West Indians, etc., the percentage of *A. duodenale* to the total number of worms harbored runs up to 90 per cent. plus or minus. In Java two ethnic stocks long resident on the island had markedly different species formulas.

TABLE 1.—VULNERABILITY OF SPECIES

| | Total Worms, No. | Species | | | | Sexes | | | | | | | | Total Worms, by Sexes | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Necators | | | | Ancylostomes | | | | | | | |
| | | Necators | | Ancylostomes | | Male | | Female | | Male | | Female | | Male | | Female | |
| | | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| 1. Total worms to be removed.... | 4,353 | 3,798 | ..... | 555 | ..... | 2,017 | ..... | 1,981 | ..... | 242 | ..... | 313 | ..... | 2,259 | 69.8 | 2,294 | 80.4 |
| 2. Worms removed by: | | | | | | | | | | | | | | | | | |
| First treatment..... | 4,296 | 3,671 | 96.8 | 425 | 76.6 | 1,976 | 98.0 | 1,695 | 95.5 | 223 | 92.1 | 202 | 64.5 | 2,199 | 51.1 | 2,097 | 49.9 |
| Second treatment..... | 217 | 108 | 2.7 | 109 | 19.6 | 38 | 1.9 | 70 | 3.5 | 16 | 6.6 | 93 | 29.7 | 54 | 24.9 | 163 | 78.1 |
| Third treatment..... | 29 | 19 | 0.5 | 20 | 3.6 | 3 | 0.1 | 16 | 0.9 | 3 | 1.2 | 17 | 5.4 | 6 | 15.4 | 33 | 84.6 |
| Fourth treatment..... | 1 | 0 | ..... | 1 | 0.3 | ..... | ..... | ..... | ..... | ... | ..... | 1 | 0.3 | ..... | ..... | 1 | * |

* Less than one-tenth of one per cent.

remedy tried in the trial treatment gives a very fair idea of the efficiency of that treatment.

The preparation of the patients for these series was uniform throughout except, of course, in the batches used for finding the effect of varying the diet and the purge in a given treatment, in which cases the dose was kept constant throughout. The preparation was as follows: The prisoners had their ordinary morning meal at 11 a. m.; but at the afternoon meal, usually served at 3 p. m., kunji, or soft rice gruel, was given. At 4 p. m., 2 ounces of a concentrated solution of magnesium sulphate was given as a purge. This contains practically 1 ounce of the salt.

Next morning they had milk instead of their ordinary meal, and were given the treatment. The last dose of medicine was followed after an hour's interval by a second purge of magnesium sulphate, and then they were kept away from work and were locked up in the cells except when let out for exercise.

The stools were collected at 2 p. m. on the day of the treatment and at 7 a. m. and 2 p. m. on the following two days. The stools were washed and examined for worms till the end of seventy-two hours, which usually gave six stools per patient.

At the end of forty-eight hours, those patients who had two consecutive stools with no worms in them were released, provided that in every case at least four

### COMPARISON OF THE EFFICIENCY OF VARIOUS VERMICIDES

In this series the comparison was made with four commonly used vermicides (Table 2). The quantity of oil of chenopodium was always measured by a graduated pipet, not by drop.

TABLE 2.—EFFICIENCY OF VARIOUS VERMICIDES

| Treatment | Valid Cases No. | Worms Removed by First or Trial Treatment, Per Cent. |
|---|---|---|
| Betanaphthol, 20 grains, in capsules, two doses with two hours' interval | 10 | 26.7 |
| Eucalyptus, 30 minims, chloroform, 45 minims, and castor oil to 12 drams, divided into two doses of 6 drams each and given with two hours' interval. | 10 | 46.9 |
| Thymol, 30 grains, in emulsion, two doses with two hours' interval | 10 | 88.6 |
| Oil of chenopodium, 1 c.c., in capsules, two doses with two hours' interval | 8 | 96.15 |

*Comment.*—In the comparison of drugs chosen and given in medium doses, oil of chenopodium appears to be the most efficient.

### COMPARISON OF THE EFFICIENCY OF OIL OF CHENOPODIUM IN VARIOUS DOSES

The following treatments were carried out on Chinese, and the preparation of the patients was uniform throughout (Table 3):

1. One c.c. three times at hourly intervals, or 3 c.c. in freshly filled capsules.
2. One c.c. twice with two hours' interval, or 2 c.c. in freshly filled capsules.
3. Two c.c. once, or 2 c.c. in freshly filled capsules.
4. Five-tenths c.c. three times at hourly intervals, or 1.5 c.c. in freshly filled capsules.
5. Five-tenths c.c. three times at hourly intervals, or 1.5 c.c. in one-half ounce of liquid petrolatum.
6. Twenty-five hundredths c.c. three times at hourly intervals, or 0.75 c.c. in freshly filled capsules.
7. Ten minims, or just over 0.5 c.c., in X's soft gelatin capsules.
8. Five-tenths c.c. of oil of chenopodium extracted from X's soft gelatin capsules.

*Comment.*—1. The relative inefficiency of X's soft gelatin capsules of oil of chenopodium is well shown in the seventh batch of this series, in which all the patients received exactly the same diet and previous purgation. That the thick walled soft gelatin capsules were at fault is proved by the results of the eighth group, which received the oil of chenopodium removed from the manufactured soft capsules and administered in freshly filled, hard gelatin capsules and in which the percentage of worms obtained was very good. In Group 7, the soft capsules dissolved too slowly to permit their contents to affect the hookworms distributed in the duodenum and the upper part of the jejunum.

2. The dosage used in our treatment with maximum doses is shown to be very effective, as it expelled 98.9 per cent. of the worms.

3. The treatment by 2 c.c. in one dose was an attempt to decide whether the tedious division of the treatment into three doses was really necessary. The first ten cases were so successful that fifteen other cases were taken to confirm or confute the result.

TABLE 3.—EFFICIENCY OF OIL OF CHENOPODIUM IN VARIOUS DOSAGES

| Treatment | Valid Cases No. | Worms Removed by Trial Treatment, Per Cent. |
|---|---|---|
| 1. Oil of chenopodium, 1 c.c., in capsules; three doses at hourly intervals, or 3 c.c. | 17 | 98.9 |
| 2. Oil of chenopodium, 1 c.c., in capsules; two doses with two hours' interval, or 2 c.c. | 8 | 96.15 |
| 3. Oil of chenopodium, 2 c.c., in capsules; one dose only, or 2 c.c. | 25 | 95.8 |
| 4. Oil of chenopodium, 0.5 c.c., in capsules; three doses at hourly intervals, or 1.5 c.c. | 9 | 95.4 |
| 5. Oil of chenopodium, 0.5 c.c., in liquid petrolatum, ½ ounce; three doses at hourly intervals, or 1.5 c.c. | 10 | 88.7 |
| 6. Oil of chenopodium, 0.25 c.c. in capsules; three doses at hourly intervals, or 0.75 c.c. | 10 | 80 |
| 7. Oil of chenopodium, 10 minims, or just over 0.5 c.c., in X's gelatin capsules; three doses at hourly intervals, or 30 minims | 10 | 66.4 |
| 8. Oil of chenopodium extracted from X's gelatin capsules, 0.5 c.c., in freshly filled capsules; three doses at hourly intervals, or 1.5 c.c. | 4 | 97.9 |

The final result of the single dose treatment (two thirds of the maximum dose) is highly creditable, with 95.8 per cent. removal of worms. It raises the question as to whether the troublesome repetition of doses is really worth while.

There were only three cases of vomiting, and only two cases of "disinclination to stand up" after the treatment.

4. The group that received only half the maximum treatment lost 95.4 per cent. of their worms, and it was thought advisable to ascertain whether a second half dose treatment would remove most of the remaining 5 per cent. of worms. There would be less toxic effect and less vomiting by this method of treatment.

Accordingly, a third series of treatments was carried out, in which two half-dose treatments of chenopodium were compared with two treatments of thymol in various forms (Table 4).

COMPARISON OF TREATMENTS WITH OIL OF CHENOPODIUM AND WITH THYMOL

The following treatments were given twice, followed by a test treatment of oil of chenopodium, and the results obtained were compared:

1. Oil of chenopodium, 0.5 c.c., in capsules; three doses at hourly intervals.
2. Thymol, 20 grains, very fine powder, in capsules; two doses with two hours' interval.
3. Thymol, 20 grains, very fine powder, in capsules, with lactose, 20 grains; two doses at two hours' interval.
4. Thymol, 20 grains, ground to fine powder; two doses at two hours' interval.
5. Thymol, 20 grains, and lactose, 20 grains, in powder; two doses at two hours' interval.

TABLE 4.—COMPARISON OF TWO TREATMENTS OF HALF THE DOSE OF OIL OF CHENOPODIUM WITH TWO TREATMENTS OF THYMOL IN VARIOUS FORMS

| Treatment | Valid Cases No. | Worms Removed by Both Trial Treatments, Per Cent. |
|---|---|---|
| 1. Two treatments of oil of chenopodium, 0.5 c.c., in capsules, three times at hourly intervals | 39 | 99.03 |
| 2. Two treatments of thymol in capsules, 20 grains twice with two hours' interval | 23 | 83.4 |
| 3. Two treatments of thymol, 20 grains, in capsules with lactose, 20 grains; two doses with two hours' interval | 10 | 79.4 |
| 4. Two treatments of thymol, 20 grains, ground to fine powder; twice with two hours' interval. | 10 | 80.6 |
| 5. Two treatments of thymol, 20 grains, and lactose, 20 grains, ground to fine powder; two doses with two hours' interval | 18 | 84.4 |

*Comment.*—In this treatment also, the superiority of oil of chenopodium over thymol in the doses given is well shown in that it removed 99 per cent. of the worms, while thymol removed about 80 per cent.

2. There seems very little to choose between giving thymol as a powder or in a capsule, and between combining it with sugar or giving it alone.

*A.* There is, however, a slight advantage in giving it as a powder, thus:

Thymol alone in capsule, 83.4 per cent. worms.
Thymol alone in powder, 80.6 per cent. worms.
Thymol with sugar in capsule, 79.4 per cent. worms.
Thymol, finely divided, with sugar in powder, 84.4 per cent. worms.

*B.* There is also a slight advantage apparent in combining it with lactose, thus:

Thymol in capsule alone, 83.4 per cent. worms.
Thymol in capsule with sugar, 79.4 per cent. worms.
Thymol in powder alone, 80.6 per cent. worms.
Thymol in powder with sugar, finely divided, 84.4 per cent. worms.

In another series of cases, larger doses of thymol were tried. Only one full test treatment of oil of chenopodium was given, and the stools were not examined for ova. Therefore, the percentage of worms removed will be a little higher when compared with the other series.

The dosages tried were:

Thymol, 30 grains, in powder, three times at hourly intervals, or 90 grains.
Thymol, 40 grains, in powder, three times at hourly intervals, or 120 grains.
Thymol, 1 dram, in powder, three times at hourly intervals, or 180 grains.

It will be seen from Table 5 that the 90 grain dosage gives a very good result, which is practically equal to the result obtained by the routine oil of chenopodium treatment.

We have shown that: Two treatments of 40 grains removed about 80 per cent. of the worms; the 60 grain dosage removed 88.6 per cent., and the 90 grain dosage removed 97.8 per cent. There is, therefore, a gradual improvement in efficiency with increase of the dose up to the 90 grain dosage. When the dose is increased beyond this, there is no improvement.

TABLE 5.—COMPARISON OF SUMMARIES OF TREATMENTS WITH THE HIGHER DOSE OF THYMOL

| Dosage | Valid Cases No. | Worms Removed by Treatment, Per Cent. |
|---|---|---|
| Thymol, 30 grains, in powder, three times, or 90 grains | 19 | 97.8 |
| Thymol, 40 grains, in powder, three times, or 120 grains | 19 | 54.2 |
| Thymol, 1 dram, in powder, three times, or 180 grains | 9 | 96.5 |

In Table 6, data are given comparing the vomiting that occurred in the thymol series with that which occurred in the chenopodium series.

TABLE 6.—INCIDENCE OF VOMITING AND THE EFFECT OF THAT VOMITING ON THE PERCENTAGE OF WORMS REMOVED

| | Thymol | Oil of Chenopodium |
|---|---|---|
| Dose given | 20 grains twice, or 40 grains | 0.25 c.c. 3 times, or 0.75 c.c. |
| Number of cases | 65 | 10 |
| Number of patients that vomited | 4, or 6.2% | None |
| Percentage of worms removed— | | |
| (a) In patients that vomited | 78.5% | No cases |
| (b) In patients that did not vomit | 78.5% | 80% |
| Dose given | 30 grains twice, or 60 grains | 0.5 c.c. 3 times, or 1.5 c.c. |
| Number of cases | 10 | 49 |
| Number of patients that vomited | None | 6, or 12.3% |
| Percentage of worms removed— | | |
| (a) In patients that vomited | No Cases | 98.6% |
| (b) In patients that did not vomit | 88.6% | 94.3% |
| Dose given | 30 grains 3 times, or 90 grains | 1 c.c. 3 times, or 3 c.c. |
| Number of cases | 19 | 20 |
| Number of patients that vomited | 3, or 15.8% | 3, or 15% |
| Percentage of worms removed— | | |
| (a) In patients that vomited | 97.9% | 100% |
| (b) In patients that did not vomit | 97.8% | 98.9% |
| Dose given | 40 grains 3 times, or 120 grains | No higher doses given |
| Number of cases | 19 | |
| Number of patients that vomited | 11, or 57.9% | |
| Percentage of worms removed— | | |
| (a) In patients that vomited | 44.3% | |
| (b) In patients that did not vomit | 90.6% | |
| Dose given | 1 dram 3 times, or 180 grains | No higher doses given |
| Number of cases | 10 | |
| Number of patients that vomited | 5, or 50% | |
| Percentage of worms removed— | | |
| (a) In patients that vomited | 93.2% | |
| (b) In patients that did not vomit | 97.0% | |

*Rate of Fall in Efficiency When the Dose Is Diminished.*—The efficiency of the maximum dose in the two drugs is practically equal; but when the dose is reduced, the efficiency is better maintained with oil of chenopodium than it is with thymol. This is shown in Table 7.

Thus, though both drugs produce about the same effect in their maximum dose, the half maximum dose of oil of chenopodium is superior to the two thirds maximum dose of thymol, especially in its effect on the ancylostomes, whereas, the quarter maximum dose of oil of chenopodium is markedly superior to the four ninths maximum dose of thymol.

The greater range of dosage with a satisfactory efficiency is a definite fact in favor of oil of chenopodium, and makes it preferable to thymol as a drug to be given to children.

*The Efficiency as Tested by the More Resistant Form of Worm.*—The effect of the two drugs on ancylostomes is an important point in relation to their relative value, as this species of worm has been shown to be more resistant than necators to the action of vermicides.

TABLE 7.—EFFICIENCY OF OIL OF CHENOPODIUM AND OF THYMOL WHEN THE DOSE IS REDUCED

| | Effect on Necators—Removed by | | Effect on Ancylostomes Removed by | |
|---|---|---|---|---|
| Dosage | Thymol Per Cent. | Oil of Chenopodium Per Cent. | Thymol Per Cent. | Oil of Chenopodium Per Cent. |
| Maximum dose | 98.3 | 99.5 | 93.5 | 96.2 |
| Two-thirds maximum dose | 95.7 | .... | 57.9 | .... |
| One-half maximum dose | .... | 97.2 | .... | 80.1 |
| Four-ninths maximum dose | 76.0 | .... | 30.1 | .... |
| One-quarter maximum dose | .... | 88.3 | .... | 63.4 |

In the results given in Table 8, it is to be seen that the difference between the efficiency of the two drugs is much less in the case of the less resistant necators than in the case of the more resistant ancylostomes.

From this one may conclude that oil of chenopodium is more effective than thymol on the more resistant form of worm.

This is of importance when there is a high percentage of ancylostomes to be treated. For instance, in Tamils, in whom the ancylostomes are relatively few, thymol would be almost as efficient as oil of chenopodium; but in Chinese, West Indians, or North Indians, or others with a high percentage of ancylostomes, oil of chenopodium should be more useful in removing worms.

*Relative Failure of the Treatment.*—This is an important piece of evidence to consider in comparing the value of two drugs; for if one is more constant in its action than the other, it would be a point in favor of using that drug for general routine treatment. In choosing cases to be regarded as showing relative failure of a treatment, those which yielded 10 per cent. fewer of their worms than the average obtained in that treatment were selected, provided no vomiting had occurred.

TABLE 8.—EFFICIENCY AS TESTED BY THE MORE RESISTANT FORM OF WORM

| Dose | Superiority in Efficiency of Oil of Chenopodium In Necators Per Cent. | In Ancylostomes Per Cent. |
|---|---|---|
| 3 c.c. of oil of chenopodium v. 90 grains of thymol | 1.2 | 2.7 |
| 1.5 c.c. oil of chenopodium v. 60 grains of thymol | 1.5 | 22.2 |
| 0.75 c.c. of oil of chenopodium v. 40 grains of thymol | 12.3 | 33.3 |

On this standard, 23.6 per cent of the 123 patients treated with thymol and only 7.6 per cent. of the seventy-nine patients treated with oil of chenopodium were classed as relative failures in treatment. This result is to be expected when one considers that a relatively insoluble powder is being compared with a penetrating oil, which would spread more readily than the powder throughout the intestine.

*Effect of Two Treatments of Smaller Dosage Than the Maximum.*—The following results show the efficiency obtained by giving two treatments of relatively small dosage:

Thymol: Two treatments of 40 grains:

Effect on necators: 2,680 removed out of 3,173, or 84.5 per cent.

Effect on ancylostomes: 96 removed out of 196, or 49 per cent.

**Oil of chenopodium: Two treatments of 1.5 c.c.:**
**Effect on necators: 2,091 removed out of 2,099, or 99.6 per cent.**
**Effect on ancylostomes: 153 removed out of 167, or 97.5 per cent.**

It is to be noted that the second treatment in the case of the thymol does not markedly increase the efficiency, which is still below that obtained by one dose of 60 grains of thymol.

On the other hand, the result of the two treatments with half the maximum dose of oil of chenopodium is seen to be better than that obtained with one full dose. This confirms the fact, previously noted, that small doses of oil of chenopodium are relatively more efficient than small doses of thymol.

It is of great importance also in showing that the best results may be obtained by giving two treatments of only half the maximum dose of oil of chenopodium. As the toxic effects of the drug would be practically negligible with the half dose, this is a great advantage in favor of oil of chenopodium.

*Ease of Administration.*—In both cases the drug must be freshly prepared for each treatment.

In the case of oil of chenopodium, the manufactured soft capsules were shown to be markedly inferior in their action to the freshly filled gelatin capsules. Thymol is a relatively insoluble solid, and in order to produce an even distribution of the drug in the intestine, it must be in a fine state of subdivision. To bring this about, the thymol must be freshly ground to a powder; if it is prepared some days before the treatment, it coheres into lumps. The admixture of an equal bulk of lactose enhances the efficiency of thymol.

An interesting illustration of the advantage, as a vermicide, of a diffusible liquid over a relatively insoluble solid is the fact that better results were obtained with thymol in the form of an emulsion than in the form of a powder, whereas with chenopodium, better results were obtained with the oil itself than with an emulsion of chenopodium.

*Preference from the Patient's Point of View.*—Fifty-eight patients, including both Tamils and Chinese that had received a thymol treatment followed by a chenopodium treatment, were asked individually after the second treatment which drug they preferred.

Only two of these preferred thymol, while one refused to give his opinion and said that each was as bad as it could be. This expression of opinion was made in spite of the fact that the memory of the thymol treatment had had a week's time to fade, while the memory of the chenopodium was more recent.

This experiment was controlled to a slight extent in a series of four cases in which oil of chenopodium was given first and was followed by thymol. They all voted for the previous treatment of chenopodium as being more pleasant to take.

### AFTER-EFFECTS OF TREATMENT BY CHENOPODIUM AND THYMOL

The minor after-effects are mainly subjective, and are very difficult to gage. They are only imperfectly susceptible of mathematical estimation. The general impressions from notes on a considerable number of cases treated with thymol and with oil of chenopodium are, however, compared in the summary given in Table 9. The symptoms are recorded in the order of their frequency and importance.

*Dizziness,* termed by the patients *pusing kapala,* or "turning of the head," was the most frequent complaint.

*A semicomatose state* was encountered not at all in the thymol cases and only rarely in the chenopodium series. The patients could not be roused to pay any attention to their surroundings. The pulse remained good; the blood pressure was taken in some of the cases, and was found normal. The effect, therefore, is probably a narcosis acting on the central nervous system, and is not cardiac in origin.

*Tingling of the hands and feet* was complained of only by the more intelligent patients. A few European patients mentioned this symptom, and the natives used the phrase *jalan darah;* that is to say, they felt the blood moving.

*Streaks of blood in the vomit* were occasionally noted. They were probably due to the strain of vomiting, whether thymol or oil of chenopodium was used. One case of bleeding from the nose after vomiting was seen.

Except with the 60 grain dose of thymol, which was administered to a group so much smaller than those receiving 40 or 90 grains that the results with the three doses are not strictly comparable, we see that *vomiting,* practically speaking, increases with the amount of drug given. In the chenopodium series, vomiting occurs in only 15 per cent. of the cases in the highest dosage given, that is, 3 c.c. The vomiting that occurs does not affect the efficiency of the treatment, for as Table 6 has shown, the patients that vomited showed as high a percentage of worms removed as the patients that did not vomit. In the thymol series also, up to the 90 grain dose, in which treatment 15.8 per cent. of the patients vomited, the patients that vomited showed the same percentage of worms removed as the patients that did not vomit. When 120 grains were given, the vomiting showed a sudden increase in incidence up to 57.9 per cent. of the cases. Those that vomited gave up only 44.3 per cent. of the worms, as compared with 90.6 per cent. in the patients that did not vomit. This shows that the limit of tolerance to the drug was exceeded, and the vomiting became severe and prompt enough to cause a considerable loss of the drug administered. The high percentage of worms removed after the 180 grain dose of thymol, in which 50 per cent. of the patients vomited, may be explained by the fact that although the patients who vomited gave up a considerable amount of the drug, the amount retained was nevertheless sufficient to effect a very satisfactory removal of worms.

The limit of tolerance was not reached in the chenopodium series, but it is probable that it would have been if slightly higher doses had been given.

This shows that by increasing the dosage of thymol it is not probable that one would be able to get better results than were obtained by the 3 c.c. dosage of oil of chenopodium.

In the treatments among another series of patients, however, the limit of tolerance for oil of chenopodium was reached at the dosage of 15 minims three times, or 2.8 c.c. Better results were obtained among these patients with the lower dosage of 10 minims three times, or 1.8 c.c. A series of nine patients treated with this dosage showed only 11.1 per cent. of vomiting, and yielded 98.9 per cent. of the worms.

A series of thirty-two cases in which no vomiting occurred in the second treatment is available for comparing the effects of the first treatments. On the first

treatment fifteen of these patients, or 46.9 per cent., vomited, and yielded 93.1 per cent. of the worms; while seventeen of them, or 53.1 per cent., did not vomit, and yielded 96.3 per cent. of the worms.

The albuminuria which occurred with oil of chenopodium was by no means always renal in origin, as this drug seems to have an action in accentuating a latent gonorrhea similar to that possessed by oil of copaiba. In determining the presence of albumin, only the heat test was used, as the cold nitric acid test gives a ring of "oleoresin" in most patients that have been treated with chenopodium. The urine was examined before treatment and on the day after treatment, and only cases without albumin before treatment are included in the figures given. In no less than four cases, the trace of albumin was found to be associated with spermatozoa. These cases were rejected as not being due to the drug.

The 40 grain dosage of thymol produces very nearly the same amount of albuminuria as the half dose of oil of chenopodium.

In both series, a substance which reduces Fehling's solution was frequently demonstrated, showing that absorption and excretion in the urine occurred with both drugs. This fact is shown also by the detection of oleoresins in the case of oil of chenopodium, and by the dark colored urine and purplish black color obtained with ferric chlorid and sulphuric acid in the case of thymol.

*Deafness* occurred only after the high dose (3 c.c.) of oil of chenopodium, and usually only after the second treatment. It was seen in five cases out of 446 treatments, or in 1.3 per cent. of the cases. The deafness that did occur was slight and very transient in most cases, but one patient is known to have remained somewhat deaf for three months. It was always of the nerve deafness type.

*Death.*—In two cases a state of deep and prolonged coma ensued, ending in death after two or three days. This occurred after the second full treatment of oil of chenopodium, and when the second treatment followed within four days of the first. We found that chenopodium was still detected in the urine up to at least 126 hours after its administration, and it is quite possible that the second dose may have a cumulative action if it is given within this limit. At least a week should certainly elapse between the two treatments.

Both deaths occurred within ten days of each other at a time when it seemed necessary to expedite the work by giving two treatments within a week. After these two deaths, the period between treatments was lengthened, with the result that although many hundreds of treatments were given subsequently to persons of all ages and conditions, no other serious or fatal incident occurred.

TABLE 9.—COMPARISON OF EFFECTS NOTED AFTER TREATMENT WITH THYMOL AND WITH OIL OF CHENOPODIUM*

| Symptom | After Thymol | After Oil of Chenopodium |
|---|---|---|
| 1. Dizziness | Frequently noted | More common |
| 2. Muscular incoordination | Noted | More marked |
| 3. Inability to rise | Noted | Much more frequent |
| 4. Semicomatose state (further stage of 2 and 3) | Not noted | Only rarely noted |
| 5. Burning in stomach | Much more marked | Noted |
| 6. Headache | More marked | Noted |
| 7. Tingling of the hands and feet | None | Noted |

8. Vomiting

| Dose, Gr. | Cases Treated | Cases Vomited | Per Cent. Vomited |
|---|---|---|---|
| 40 | 65 | 4 | 6.2 |
| 60 | 10 | 0 | 0.0 |
| 90 | 19 | 3 | 15.8 |
| 120 | 19 | 11 | 57.9 |
| 180 | 10 | 5 | 50.0 |
| Total..... | 123 | 23 | 18.7† |

| Dose, C.c. | Cases Treated | Cases Vomited | Per Cent. Vomited |
|---|---|---|---|
| 0.75 | 10 | 0 | 0.0 |
| 1.5 | 49 | 6 | 12.2 |
| 3.0 | 20 | 3 | 15.0 |
| Total..... | 79 | 9 | 11.4† |

9. Albuminuria

| Dose, Gr. | Examined | Positive | Per Cent. Positive | Origin: Renal | Origin: Gonorrheal | Origin: Not Diagnosed |
|---|---|---|---|---|---|---|
| 40 | 50 | 6 | 12 | 2 | .. | 4 |

| Dose, C.c. | Examined | Positive | Per Cent. Positive | Origin: Renal | Origin: Gonorrheal | Origin: Not Diagnosed |
|---|---|---|---|---|---|---|
| 1.5 | 52 | 7 | 13.5 | .. | .. | 7 |
| 3.0 | 39 | 8 | 20.5 | 1 | 4 | 3 |

10. Deafness

| Dose, C.c. | Total Number Treatments | Cases of Deafness: Number | Cases of Deafness: Per Cent. |
|---|---|---|---|
| 1.5 | 600 | 0 | 0.0 |
| 3.0 | 446 | 5 | 1.3 |

| 11. Death | None | Two, after two treatments of 3 c.c., administered with an interval of only four days between |
|---|---|---|

* Figures cover 123 cases treated with thymol in doses ranging from 40 to 180 grains, and 79 cases treated with oil of chenopodium in doses ranging from 0.75 to 3.0 c.c.

† The higher percentage of total cases with vomiting after thymol than after oil of chenopodium may be attributed mainly to the administration to twenty-nine patients, in the case of thymol, of doses that exceeded the limit of tolerance.

### INFLUENCE OF THE PURGE

In one of the institutions, the language difficulties were great; and as we desired to ascertain by personal

inspection rather than by interrogation the effect of chenopodium as influenced by the purge, we divided the squads of men into halves. Those on one side of the ward were given magnesium sulphate; those on the other side were given castor oil. The castor oil squad always showed the greater number of cases of dizziness and deafness; most of the cases of inability to rise and walk occurred is this group.

The urine of patients taking castor oil contained much heavier precipitates when tested for oleoresin than those that had taken magnesium sulphate.

Dizziness and muscular incoordination were less with magnesium sulphate than with castor oil, compound mixture of senna or calomel.

### EFFECT OF VARYING THE DIET AND OF OMITTING THE FIRST PURGATIVE DOSE

In this series the same dose of oil of chenopodium was given in all cases, but a different scale of diet was given to each group of ten patients, all of whom were Chinese. Each group was subdivided into five patients, one half receiving a previous purge and the other half receiving no purge before treatment. All patients got the purge following the chenopodium treatment.

In this way we have two series of results to compare, (*a*) with purge and (*b*) without purge in each of the following groups:

Diet 1: Full diet all through the treatment.

Diet 2: Full diet all the day previous to treatment, but milk on the morning of treatment.

Diet 3: Rice gruel (*kunji*) on afternoon of the day previous to treatment, but milk on the morning of treatment.

Diet 4: Only milk during the day previous to treatment, and only milk on the morning of treatment.

It will be seen that Diet 3 is the one that was used in routine preparation for treatment, and Diet 4 approaches a little more toward a condition of starvation than that which was used in the preparation of cases. The results are shown in Table 10.

TABLE 10.—EFFECT OF VARYING THE DIET AND OF OMITTING THE FIRST PURGATIVE DOSE ON THE RESULT OBTAINED WITH OIL OF CHENOPODIUM

| Diet Used | With Purge | | Without Purge | |
|---|---|---|---|---|
| | Valid Cases, No. | Worms Removed, Per Cent. | Valid Cases, No. | Worms Removed, Per Cent. |
| Diet 1: Full diet all through the treatment | 5 | 44.5 | 5 | 57.1 |
| Diet 2: Full diet all the day previous to treatment, but milk on the morning of treatment | 4 | 88.7 | 4 | 87.5 |
| Diet 3: Rice gruel (kunji) on the afternoon previous to treatment, but milk on the morning of treatment | 4 | 92 | 5 | 95.7 |
| Diet 4: Only milk during the day previous to treatment, and only milk on the morning of treatment | 12 | 78.7 | 14 | 56.3 |

*Comment.*—There is a steady increase in the percentage of worms removed with the increase in amount of deprivation up to Diet 3, or the diet used in the routine preparation of cases. When the starvation is increased beyond this, a remarkable drop in the percentage of worms removed was noted.

Another group of twenty patients was treated with the extra deprivation Diet 4, and the drop in efficiency was confirmed.

The omission of the initial purge did not seem to have any effect in lowering the efficacy of oil of chenopodium except in Diet 4. The preliminary purge, therefore, may be omitted under certain circumstances.

### INVESTIGATION OF THE MODE OF ACTION OF EUCALYPTUS AND CHLOROFORM

For this purpose, one group of patients was given eucalyptus in castor oil only, and a third group was given the combined treatment. The fourth group was given first a treatment of eucalyptus and then a treatment of chloroform, and the worms obtained in each treatment were compared (Table 11).

TABLE 11.—MODE OF ACTION OF EUCALYPTUS AND CHLOROFORM

| Treatment | Valid Cases No. | Worms Removed by Trial Treatment, Per Cent. |
|---|---|---|
| 1. Eucalyptus | 7 | 0 |
| 2. Chloroform | 8 | 30.0 |
| 3. Eucalyptus and chloroform | 10 | 46.9 |
| 4. First trial treatment: Eucalyptus | 8 | 2.7 |
| 5. Second trial treatment: Chloroform | 8 | 49.3 |

*Comment.*—1. Eucalyptus ranks very low indeed as a vermicide.

2. The greater part of the effect of the combined treatment is due to the chloroform.

3. On the other hand, although eucalyptus does not remove worms to any extent, it seems to aid chloroform in its action, thus:

Chloroform by itself brought away 30 per cent. of worms.

Chloroform combined with eucalyptus removed 46.9 per cent. of worms.

Chloroform preceded by eucalyptus removed 49.3 per cent. of worms.

In another series, oil of chenopodium was administered with chloroform, castor oil and mucilage acacia, the dosage of oil of chenopodium being 30 minims in one series, and 40 minims in another. During the earlier treatments in this series, excellent results were obtained; but severe vomiting in certain of the cases considerably reduced the percentages of worms removed in the total cases; this, it was thought, was probably due to the effect of chloroform, so that while the vermicidal powers of chenopodium may be enhanced by chloroform, the increased amount of vomiting renders the combination less efficient.

### ADMINISTRATION OF CHENOPODIUM

We have shown elsewhere that the soft gelatin capsules supplied in sealed tins by certain manufacturers were relatively inefficient, and we recommend that the oil of chenopodium be administered in hard, dry gelatin capsules, filled a few hours before use.

TABLE 12.—COMPARATIVE COST OF THYMOL AND CHENOPODIUM *

| Thymol | Cost | Removal of Worms Efficiency Per Cent. | Oil of Chenopodium c.c. | Cost | Removal of Worms Efficiency Per Cent. |
|---|---|---|---|---|---|
| 40 grains | $0.06 | 73.3 | 0.75 | $0.014 | 80.0 |
| 60 grains | 0.09 | 88.6 | 1.5 | 0.027 | 95.7 |
| 90 grains | 0.135 | 97.8 | 3 | 0.055 | 98.9 |

*Calculated at thymol, 0.15 cents per grain, and oil of chenopodium, 1.84 cents per cubic centimeter.

### EFFECT OF CHENOPODIUM AND THYMOL ON WORMS OTHER THAN HOOKWORMS

Chenopodium is relatively just as efficacious in removing *Ascaris, Clonorchis* and *Taenia.* Even *Oxyuris* and *Trichuris,* which normally live in the appendix, cecum and large bowel, yielded to this drug. In two series of treatments the effect of thymol and oil of chenopodium in removing ascarides was ascer-

tained by giving trial doses of thymol, and test doses of oil of chenopodium. When thymol in 45 grain doses was given, only 20 per cent. of the ascarides present were removed, and when 90 grains of thymol were administered the percentage was 32.7. In Java, the average number of ascarides per individual was in men 9.1, boys 12.4, women 13.7, and girls 25.0. The more powerful drug is required there to remove the large numbers of ascarides harbored.

TABLE 13.—SUMMARY OF COMPARISON OF THE VALUE OF THYMOL AND OIL OF CHENOPODIUM

| Thymol | Oil of Chenopodium |
|---|---|
| 1. The 90 grain dose produces a very satisfactory removal of worms. | 1. Three c.c. produced the largest vermifugal effect of any single treatment tried, but the result is only slightly superior to the corresponding dose of thymol. |
| 2. Higher doses, for example 120 grains, removed fewer worms because the vomiting that occurred reduced the amount of drug retained in the stomach to below the amount required for efficient removal of worms; but with 180 grains, though much vomiting occurred, the amount of the drug retained was still sufficient to effect a satisfactory removal of worms. | 2. The dose at which the vomiting causes loss of efficiency was not reached at one institution, although 3 c.c. were given. At another, 46.9 per cent. of vomiting occurred with loss of efficiency at the 15 minims three times, or 2.8 c.c. dosage. |
| 3. No serious toxic symptoms were noted even with the highest dose. | 3. The highest dose (i. e., 3 c.c.) occasionally produced toxic effects on the nervous system, such as nerve deafness and coma. |
| 4. No serious toxic symptoms were noted even with the highest dose. | 4. In the lower doses, 1.5 c.c. and under, no deafness or coma occurred. |
| 5. Diminution of the dosage produced a rapid falling off of efficiency. | 5. The efficiency was well maintained when the dose was reduced even down to a quarter of the maximum dose. |
| 6. Two treatments with a small dose did not produce a good summation in the results. | 6. Two half maximum doses produced a better result than the full maximum dose, and the highest percentage of worms removed was obtained by this treatment, i. e., 99.6 per cent. of necators and 97.5 per cent. of ancylostomes. |
| 7. Thymol was voted, by a great majority of the patients treated, as more unpleasant to take than oil of chenopodium. | |
| 8. The comparisons made under 5, 6 and 7 render thymol less suitable for use in the treatment of children than oil of chenopodium, as for children the smaller doses would be required. | |
| 9. The effect on the more resistant forms of worm has been shown to be less, dose for dose, with thymol than with oil of chenopodium. | |
| | 10. This renders chenopodium as the drug for choice in treating Chinese, West Indians or any other people with a high percentage of ancylostomes. |
| 11. Thymol, being a relatively insoluble powder, has less opportunity than chenopodium of becoming uniformly distributed throughout the intestinal contents. | 11. Chenopodium, being a thin oil, will become more evenly diffused along the intestine. |
| 12. Based on Consideration 11, the action of thymol was less uniform than chenopodium, and showed 23.6 per cent. of cases in which relative failure of the treatment occurred. | 12. Only 7.6 per cent. of the patients treated with chenopodium showed relative failure of the treatment. |
| 13. Thymol removes a proportion of the worms of species other than hookworms. | 13. Oil of chenopodium has been shown to be more effective in removing all the other species than thymol. |

## CONCLUSIONS

It would appear from the comparisons given in Table 13 that the half maximum dose (0.5 c.c. three times, or 1.5 c.c.) of oil of chenopodium is the treatment for recommendation as a routine vermicide.

It does not have the toxic effects of the full dose, and two treatments have the very satisfactory result of removing 99 per cent. of all worms present.

It has the additional advantage of a more uniform action, a greater effect on ancylostomes, and of being less unpleasant to take than thymol.

Thymol shows an advantage over this half maximum dose of oil of chenopodium in that, without producing toxic effects, the 90 grains' dosage produces a better result when single treatments are compared. This advantage disappears, however, when two half maximum treatments of oil of chenopodium are given.

Smaller doses compare unfavorably with a single half maximum dose of oil of chenopodium. A dose as large as 90 grains of thymol, if administered indiscriminately throughout the population, would probably give rise to serious symptoms.

## METHODS OF EXAMINING FECES

The following notes are appended for the information of any officers who may be interested in the methods we pursued in washing and examining the feces of our patients:

The examination of the feces of treated patients for worms, involving as it does the careful search through four or more stools from each patient, is a tedious process; and our constant aim was to secure the greatest accuracy.

The method we adopted was fairly uniform, and the details are as follows:

*Labeling.*—Each patient was labeled by means of a numbered ribbon or metal disk attached to his wrist, and he was given a chamber pot labeled with the corresponding number. Great care was taken to avoid the possible mixing of feces of different patients. In jails it was comparatively easy to avoid this, since each patient was confined to his cell. In hospital wards the chamber was placed by the patient's bed, and the dressers were given instructions to prevent the use by a patient of a chamber not his own. The patients themselves were also given explicit instructions. They were thoroughly drilled in remembering their numbers and in taking their places in right numerical order for treatment and for the changing of chambers. In the case of children, this drilling was facilitated by a scheme of rewards and punishments. In one series the possibility of error from mixing stools of different patients was controlled. At the time of treatment each patient was given a dose of small glass beads. These beads varied in color and size, and only one sort was given to each patient. The doses were so arranged that patients who occupied adjacent beds received doses of different colors or types. The patients continued to pass these beads for three or four days. Since there was no mixing of the different kinds of beads in the stools, it is fair to presume that there was no mixing of feces. In the whole series of treatments, the error from the mixing of feces of different persons must have been negligible. Eastern people are usually amenable and tractable, and this contributed largely to the successful conduct of our work. As a routine, the feces were brought to the place of examination twice daily, in the morning and at about 2 o'clock in the afternoon. They were usually carried in by the patients themselves. As the patients entered the laboratory, the numbers on the chambers and on the patients' wrists were compared, and a slip of paper with the corresponding number placed in the chamber with the feces. Each patient then received a new chamber properly numbered. A record was kept of patients who brought no stools, and a purge was given them when necessary.

*Washing Stools.*—Soft or fluid stools were ready to be washed at once. Very compact stools were often stirred in a quantity of water and allowed to soften somewhat before washing. In washing, the contents of a chamber, together with the numbered slip, were rinsed by a jet of water into a large sieve. The washing was done in the sieve under a jet of water. When a tap was available, the washing was done in the sink beneath it. In most cases there was no water piped to the laboratory, and it was necessary to use a stream siphoned through a rubber hose from some large container placed some feet above the ground. The lower end of the hose was provided with a pinch cock to regulate the stream.

A fine brass wire sieve was used with a mesh of 50 to an inch.

Close supervision was exercised to prevent splashing and consequent loss of material, and to see that no worms were carried from one stool to another by adhering to the sieve.

After washing, the worms with the remaining insoluble portion of the stool were rinsed, together with the labeled slip, into the chamber bearing the corresponding number.

*Removal of the Worms from the Washed Stools.*—The washed stools were distributed into photographic developing trays, a small portion into each tray. A dark brown colored tray was found to give the best background for the worms. The worms were picked out with needles or forceps and placed in Petri dishes containing physiologic sodium chlorid or diluted magnesium sulphate solution, and properly numbered. When a tray had been examined by a subordinate and the worms presumably all removed, it was always reexamined by one of us preferably on both white and dark ground. One of us could do this final inspecting for two or more assistants, depending on the number of worms that had to be picked out.

The original numbered slip was placed, number side up, under the cover of the Petri dish as a label. This paper slip, therefore, remained in contact with the contents of the stool from the time the chambers were received up to the final counting and recording of the worms, and was very effective in preserving accuracy. We made it a routine to examine at half-day intervals at least four stool collections from each person. The number that had to be examined was usually greater than that, since the washing in a case was not considered complete until two consecutive negatives had been obtained. It is important to get the last worms expelled, since the proportions of different species and sexes vary somewhat according to the interval following treatment.

*Counting and Classifying Worms.*—After every washing, a record was made of the numbers and sex of the different species.

The excess of sodium chlorid was drained off, and the Petri dish was flooded with boiling 60 per cent. alcohol. The worms are fixed by the alcohol and become rigid in the form characteristic of each species, thereby rendering differentiation of the species easy. Magnesium sulphate solution well diluted also serves well as a differentiating medium, and *Ancylostoma duodenale, Necator americanus, A. ceylanicum,* or other helminths take on characteristic appearances in it.

## BALANTIDIUM COLI INFECTION IN OKLAHOMA *

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The infrequent occurrence of *Balantidium coli* infection in man has prompted the careful study and reporting of a case that occurred during the past year in the service of one of us (A. D. Y.). Additional interest in the case was stimulated by the fact that to the best of our knowledge this is the first case to be reported from the state of Oklahoma. Moreover, as amebic and bacillary dysenteries are not uncommon in this semitropical country, we are glad to call attention to this additional member, evidently endemic to this locality.

Since the first definite description of the *Paramecium coli* and the report of a case by Malmsten[1] and Loven in 1857,,altogether less than 150 cases of the infection have been recorded in man. From a careful search of the literature by Strong[2] in 1901, infections by the *Balantidium coli* up to that time numbered 117, and included reports from Africa, Cochin China, Cuba, Finland, Germany, Italy, North and South America, the Phillipines, Russia, the Sunda Isles and Sweden. In this country, probably the first case was reported by Mitter[3] in 1891 in a patient from Iowa. Since then, Bel and Couret[4] reported a case from Louisiana, Grey[5] three from Arkansas, Deaderick[6] one from eastern Arkansas, Sistrunk[7] one from Minnesota, the Rockefeller Sanitary Commission[8] two cases from North Carolina and one from Mississippi, and Jennings[9] one from New York.

Thanks to the careful studies by Strong[2] and Solowjew[10] of human cases, and the observations of Brooks[11] on a fatal dysentery among the apes in the New York Zoological Garden, there is little doubt as to the infectious character of the *Balantidium coli.* These studies, together with those of Bel and Couret[4] on the pathologic histology of the infection, have shown that the parasites invade all the coats and vessels of the large intestine, together with the neighboring lymph glands. This invasion is associated with a hyperplasia of lymphoid and plasma cells and eosinophils in these structures. The shallow ulcers in the intestinal wall are probably due largely to a secondary invasion by bacteria at the point of entrance of the larger parasite, as the *Balantidium* is not to be found in these ulcerations.

Various modes of infection have been suggested by the several investigators. Leuckart [12] first showed the pig to be the normal host of the organism, and suggested that infection of a human being occurred by admission of the freshly voided parasites into the alimentary canal in the food or the drinking water. He also suggested the probable entrance of the organism into the human body in the encysted state. Klein[13] reported finding the *Paramecium coli* in sewage, and the parasite has also been found in the drinking water of London, which strongly suggests the possibility of this mode of infection. However, about 25 per cent. of reported cases appear to have occurred from direct contact with swine, or following the ingestion of food products made from pork. Chichulin[14] reported an entire family infected after eating sausages made from a hog which harbored *Balantidium.* The clinical history in our case suggests two possible chances that the infection was derived from the hog directly.

### REPORT OF CASE

*History.*—A white man, aged 60, born in Kansas, where he lived for thirty-eight years, when he came to Oklahoma, where he had since lived continuously for the past twenty-two years, could not remember any sickness of any severity during his life, and had not been confined to bed for illness for the past forty years. The family history was negative. The patient was admitted to the hospital, April 22, 1917, complaining of severe diarrhea, abdominal pains, and tenesmus. He had from twelve to sixteen watery stools a day.

* From the Bierce Memorial Laboratory of St. Anthony's Hospital.

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The patient worked as a laborer, and one year before was feeding a small herd of twelve hogs. These animals all died of some unknown disease. During this time and up to eight months before, the patient was employed in a local packing plant as a "gut stripper," that is, in cleaning out the contents of the intestine. The patient stated that he was acustomed to stand ankle deep in hog dung, and that every day he was sprinkled with it and frequently got the fecal material in his mouth.

About eight months previous to admission to the hospital he began having frequent bloody stools and tenesmus, which continued with intermittent normal periods up to the present. During that time he had lost about 40 pounds in weight.

*Physical Examination.*—The patient was greatly emaciated and weak. The skin was dry. The pupils reacted normally to light and accommodation, but hearing was markedly reduced in both ears. Mentally he was stuporous, but otherwise the nervous system was good. The mouth was in a markedly septic condition from carious teeth and pyorrhea alveolaris. Otherwise the physical findings were immaterial. The temperature never exceeded 99 F., and was usually normal. The pulse averaged 78, and respiration 20 per minute. Protoscopic examination revealed the walls of the rectum and lower colon covered with thick, bloody mucus. When this was scraped away, many shallow, bleeding ulcers were seen. Repeated examinations revealed a light yellow liquid stool containing much mucus and blood, and swarming with *Paramecium coli.* No other parasitic or bacterial invasion was present. The urine examination was negative. The sputum examination was negative for amebas and *Balantidium.* Blood smears were negative for protozoa, anemias and leukemia. The hemoglobin was 80 per cent.; red blood cells, 4,610,000; white blood cells, 12,600; polymorphoneutrophils, 78 per cent.; lymphocytes, 21 per cent.; eosinophils, 1 per cent.

*Treatment and Course.*—Under treatment with enemas (15 grains of quinin in 1 quart of water) given as frequently as every fourth hour at first, and then gradually decreased in frequency, the organism had entirely disappeared from the stools by May 7, 1917. The patient was discharged from the hospital, May 8, with stools of normal consistency and free from parasites. At this time he was placed on compound solution of iodin (Lugol's solution), 3 drops, three times a day, and he continued this treatment for two months.

The patient was not again heard from until Jan. 7, 1918, when he returned complaining of an uncomfortable feeling in the abdomen, not painful, but of a twisting nature. Examination revealed a stool of normal consistency and color which contained an occasional *Balantidium coli.* The patient weighed 169½ pounds, a gain of approximately 29 pounds, and he stated that he had never felt better than during the past nine months. At present he is under treatment with quinin and iodin.

### THE BALANTIDIUM COLI

The parasite studied by us in this case belongs to the ciliated infusoria, and is commonly known as the *Balantidium coli,* or *Paramecium coli.* The body is nearly oval, one side being somewhat longer than the other, and it measures from 0.06 to 0.01 mm. in length and from 0.05 to 0.07 mm. in breadth. The anterior end shows a short, broad, funnel-shaped peristome situated a little to one side of the anterior pole, and running back toward the center of the body. The anus is terminal at the more pointed posterior pole. The organism is encased in a thick ectosarc thickly set with cilia which surround and extend into the peristome, about which their circulatory motion keeps up a continuous inward whirl. The endosarc shows ordinarily a bean shaped nucleus, two contractile vacuoles, and many bacteria, blood cells, and finely divided food particles. The surface of the animal shows the characteristic longitudinal striations. The body exhibits great permanence of form by reason of a seeming elasticity of the ectosarc, which allows it to assume all sorts of forms when in crowded quarters; but it always returns to the oval shape when in free fluid.

The organism moves forward rapidly with a rotary motion. In dying, it ceases the forward motion and begins to rotate. Its form becomes rounder, and the motion of the cilia slower. Small globular masses exude from the anus and peristome. Finally the parasite becomes a small, round, granular mass surrounded by a capsule, or shell.

Reproduction was observed by binary fission, but not by budding. No attempt was made to cultivate the organism in view of the repeated failure of other workers to accomplish this purpose.

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## CIRCULATORY FAILURE

### THE DIFFERENTIATION BETWEEN THAT DUE TO SHOCK AND THAT DUE TO OTHER CAUSES*

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NEW YORK

The term "circulatory failure" characterizes any condition in which the arterial pressure and, consequently, the capillary stream are reduced to such an extent that, if long continued, the functions of the normal organs are impaired and those of previously deranged organs are prevented from regaining their normal activity.

Progressive circulatory failure is a frequent and serious accompaniment of the clinical condition to which long usage has conferred the term "shock." Does it follow, *ipso facto,* that all forms of circulatory failure are due to shock and that, therefore, the condition of the arterial pressure is an index of shock and a guide as to the prognosis and efficacy of remedial measures? Or is circulatory failure produced by various agencies, among which "shock" is only one? Again, is the circulatory failure in shock distinctive in character so that it can be differentiated from other forms?

An answer to these questions is of more than academic importance, for unless circulatory failure in all conditions is produced by shock and is of the same physiologic nature, it is probable that the treatment will vary in different cases and that the concerted attempts to discover a single remedy of value in all forms of circulatory failure is futile.

Complying with the request of the Committee on Physiology of the National Research Council to partake in a cooperative investigation of the shock problem, the work in the physiologic laboratory at Cornell Medical College was organized in the spring and autumn months of 1917 to investigate these phases of the shock problem, which are of fundamental importance. To this end the pressure changes occurring in the auricles, ventricles, pulmonary circulation and systemic arteries were investigated under light ether anesthesia in naturally breathing animals in which various forms of circulatory failure were induced.

### METHODS

In all experiments, the mean arterial pressure was continually recorded by a damped mercury manometer, and the respirations were likewise continuously registered by a tambour connected with a pleural cannula. These afforded a rough criterion of the state of the

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circulation and respiration in various forms of circulatory failure.

In addition, other hemodynamic changes during circulatory failure were studied in different groups of experiments. In one series of animals the changes in the "effective venous pressure," that is, the difference between the intrathoracic and intra-auricular pressures,[1] were followed by the use of a differential water manometer. Such a manometer is made when the fluid-filled limb of a water manometer is connected to a sound filled with sodium sulphate solution and inserted, by way of the jugular vein, into the right auricle; while the air-filled limb is connected with a trocar inserted into the thoracic cavity. Naturally, the precaution must be observed that during the course of the experiment the openings of the pleural cannula do not become occluded by the lungs and that the venous sound remains free from clots.

In another group of animals, the variations of the pulmonary arterial pressure were recorded by a mean-pressure manometer. This was done, in animals that continued to breathe naturally, by inserting a cannula into a pulmonary artery and subsequently repairing the thorax, after the technic that I have described[2] in detail elsewhere. The results from this phase of the question are to be credited to the cooperative investigations of Miss A. Kuehner, Messrs. H. Belcher, H. Sooper, W. Dodd, R. Douglass, M. Holsted and J. Sutton, Jr.

In still another extensive series of experiments, the details of the pressure curves in the right auricle, right ventricle and common carotid were investigated by optically recording manometers at regular intervals during the progress of circulatory failure. The details of certain phases of this investigation will be subsequently reported. It is my purpose here to state the chief results briefly, and to emphasize their practical significance in diagnosis and treatment.

### TYPES OF CIRCULATORY FAILURE

The types of circulatory failure studied comprise those due to (1) exposure of the intestine; (2) hemorrhage; (3) the prolonged use of nitrites; (4) acute cardiac failure; and (5) the intravenous injection of oil and consequent fat emboli.

1. *Circulatory Failure Due to Abdominal Shock.*—The method *par excellence* of producing typical surgical shock consists in exposing the intestinal coils and allowing a stream of moist, warm air to blow over them. Experience showed that a more regular and more certain circulatory failure is induced when the intestinal loops are not manipulated. The course of circulatory failure thus produced may be divided into three stages. During the initial stage, lasting as a rule about thirty minutes after exposure of the intestine, the mean arterial pressure falls slightly or may be maintained, but in either case the arterial pressure variations recorded by optical manometers indicate that the volume of blood contained in the large arteries is reduced. The blood column ejected by the ventricular systole is thrown with greater vigor and recoils more than is normally the case. The pressure falls more rapidly throughout the systole and diastole, as the effective venous pressure during this stage is not affected or even increases. As the contour of the intraventricular pressure curves do not alter, as the heart rate, if it undergoes any change, increases, and as the pulmonary arterial pressure remains unaltered, the conclusion is reached that the reduction in the blood content and fall of pressure in the arteries is not due to a decrease in the minute volume of the heart, but to a reduction in the total arterial resistance.

During the second or progressive stage of circulatory failure, lasting through the next two to four hours, the arterial pressures progressively fall, and the optical tracings indicate that the volume of blood injected by the ventricle into the aorta during systole is relatively smaller than the amount leaving the arterial system peripherally during the interval of systole and diastole combined. As the effective venous pressure progressively lowers, as the intraventricular curves show evidence of diminished efficiency, and as the pulmonary arterial pressure is reduced, the conclusions are reached that (1) a deficient ejection of the ventricle occurs in spite of an increased heart rate, and (2) this is predominantly responsible for the fall of systemic pressures.

During the third stage, or the phase of complete circulatory failure, these changes are maintained or accentuated. The heart slows, and this contributes still further to the fall of arterial pressure, until the animal dies of respiratory failure.

Briefly summarized, circulatory failure in abdominal shock is characterized, in addition to the fall of arterial pressure, by a low peripheral arterial resistance, a reduced venous pressure, and deficient systolic discharge of the ventricles.

2. *Circulatory Failure Due to Hemorrhage.*—A reinvestigation of the sequence of events in hemorrhage by the methods indicated above confirmed my conception as to the sequence of dynamic events, published several years ago.[3] Briefly stated, if an artery of considerable size is opened, the total arterial resistance to the flow of blood from the aorta diminishes and the arterial pressures fall. The pulse pressure becomes greater, and the systolic and diastolic pressures decline more rapidly. The effective venous pressure does not decrease at once, the cardiac efficiency, as determined by the contour of the ventricular pressure curve, is unchanged, and the pulmonary pressure is unaltered, or may increase slightly if the heart accelerates. If the hemorrhage is from a vein, the systemic and pulmonary arterial pressures are unaffected by a similar loss of blood.

With the continued loss of blood the venous return is affected so much that the effective venous pressure is reduced, the cardiac discharge is impaired and, in spite of cardiac acceleration, the minute output of the heart is diminished. Pulmonary arterial and systemic arterial pressures then fall together, owing to this central factor as well as to the total vascular resistance, which remains below normal in spite of compensatory contraction in unimpaired vessels. If bleeding is unchecked, these events continue until death from respiratory failure supervenes.

It is apparent that the dynamic mechanisms operating in abdominal shock and from prolonged arterial hemorrhage are precisely alike. In both, a reduction of arterial resistance initiates the fall of arterial pressure; in both, a diminished venous return, a fall of effective venous pressure, and a deficient cardiac discharge are prominent factors in the fatal fall of arterial pressure.

3. *Circulatory Failure from Prolonged Use of Nitrites.*—It is exceedingly difficult in the dog to obtain

1. Henderson and Barringer: Am. Jour. Physiol., 1909, **23**, 350; ibid., 1913, **32**, 288.
2. Wiggers, C. J.: Am. Jour. Physiol., 1912, **30**, 247.
3. Wiggers, C. J.: The Pathologic Physiology of the Circulation During Hemorrhage, Arch. Int. Med., July, 1914, p. 33.

any permanent fall of arterial pressure through vasodilatation alone. As the "nitrites" on injection exert no *direct* effect on the circulation other than to produce a vasodilatation, their use seemed to offer the most advantageous method of producing a prolonged vasodilatation unattended by disturbances other than those that are secondarily called into play. Since the prolonged use necessary to maintain maximal vasodilatation causes the transformation of the hemoglobin to methemoglobin and so reduces the oxygen-yielding power of the blood, it is probable that the final circulatory failure following their prolonged use is attributable to other actions than the vascular effect alone.

The slow infusion of sodium nitrite or continued inhalation of amyl nitrite produces an initial rapid fall of arterial pressure. The fall is rarely below 80 mm., however, when systemic pressure is normal. The optical tracings during this stage show the same changes that are characteristic in abdominal shock, and indicate a reduced arterial volume due to a diminished total resistance. The heart is moderately or markedly accelerated, depending on the original degree of vagal tone. There is no evidence that the maximal degree of peripheral arterial dilation possible is able per se to reduce the effective venous pressure. It remains unaltered or rises if the cardiac acceleration is not too great, but may fall slightly when cardiac acceleration is extreme. The pressures in the pulmonary artery and left auricle rise,[4] probably on account of the cardiac acceleration and augmented minute discharge. The intraventricular pressure curves show no change from normal. After arterial pressure has reached its lowest level, it gradually recovers in spite of continued infusion or inhalation of nitrites. The arterial pressure curves optically recorded indicate that there is less disproportion between systolic injection and peripheral outflow. Since the pulmonary arterial pressure remains high and the heart continues to accelerate, this may be attributed to an increasing cardiac discharge. This stage of recovery may be short lived or continued for a considerable interval. It is followed by a period when both systemic and pulmonary arterial pressures fall, the heart slows, and the effective venous pressure increases slightly. These effects are evidently due to a failing heart, and lead rapidly to death. Whether this is due to a direct action of the nitrites on the heart or to deficient oxidation from excessive formation of methemoglobin is difficult to say.

To summarize, nitrites, through a reduction of peripheral resistance, cause a pronounced and rapid fall of arterial pressure. The dilatation thus produced does not markedly affect the effective venous pressure, while the rapid rate definitely increases the pulmonary arterial pressure. Prolonged vasodilatation, then, in itself does not lead to complete circulatory failure. This occurs after prolonged administration, owing to cardiac failure accompanied by an elevation of effective venous pressure.

4. *Circulatory Failure Following Acute Cardiac Failure.*—By acute cardiac failure is meant a failure of the inherent contractile power of the heart so that it is unable, when supplied by an adequate volume of venous blood, to transfer it to the arterial side. Such acute cardiac failure, superimposed on reduced peripheral resistance, is the cause of circulatory failure after nitrites. It is a frequent cause of death in cardiac diseases. It may be studied experimentally as an isolated factor in circulatory failure through the depressant effects of concentrated ether vapor or infusion of potassium salts.

In both cases the arterial pressure falls progressively. The pulmonary arterial pressure is also steadily lowered, but the effective right auricular pressure increases markedly, owing to the fact that blood is dammed back. The intraventricular pressure curves rise less steeply in spite of a higher initial pressure, and the heart rate is slowed.

5. *Circulatory Failure Following Intravenous Injection of Neutral Oil.*—Neutral olive oil, as such and in emulsions made by the use of soaps, lecithin and gum acacia, were injected into the femoral or jugular veins, in doses ranging from 0.5 to 24 c.c. per animal.

The smaller doses were without effect on the mean arterial pressure, but the pressure curves recorded from the right ventricle showed typical signs that the right ventricle was contracting against an increased resistance.[5] The change was not great enough to affect the mean pulmonary arterial pressure, as recorded, or the effective venous pressure, as measured by the differential manometer.

Larger doses (that is, above 5 c.c.) produced a fall of mean arterial pressure. The pressure in the pulmonary artery increased, and the effective venous pressure also was markedly increased. The intensity of the pressure changes depended somewhat on the amount of oil injected.

SUMMARY OF DYNAMIC CHANGES IN DIFFERENT FORMS OF CIRCULATORY FAILURE*

| Cause of Circulatory Failure | Arterial Pressure Change | Pulmonary Arterial Pressure Change | Right Ventricular Efficiency | Effective Venous Pressure |
|---|---|---|---|---|
| 1. Abdominal shock: | | | | |
| Early stage | — | 0 | 0 | 0 or + |
| Late stage | — — | — | — — | — — |
| 2. Progressive hemorrhage | | | | |
| Early stage | — | 0 | 0 | 0 |
| Late stage | — — | — | — — | — — |
| 3. Nitrites | | | | |
| Early stage | — | + | 0 | 0 |
| Late stage | — — | — | — | + |
| 4. Acute cardiac failure. | — | — | — | ++ |
| 5. Fat embolism | — | ++ | — | ++ |

* Double plus and double minus signs indicate a pronounced increase and decrease, while single signs denote a slight or moderate change.

Larger doses produced a fall of mean arterial pressure. Simultaneously, the pulmonary arterial pressure and effective venous pressure increased markedly. These changes can be referred only to pulmonary emboli, the existence of which was also verified by microscopic examination kindly carried out by Professor Ewing. The intensity and rapidity of these pressure changes was not always proportional to the quantity of oil injected, but depended apparently on the number of lung passages that were clogged by the fat emboli. In the case of pronounced embolism, death occurred within a few minutes, because of respiratory failure consequent to the extremely low blood pressure. Incidentally, it may be pointed out that, in spite of the extreme distention of the right heart and enormous rise of venous pressure, auricular fibrillation never occurred, as verified by the electrocardiogram. If pulmonary embolism is less extensive, and an adequate number of pulmonary paths remain open, the arterial pressure becomes reduced, owing to the deficient discharge of the left ventricle and, after

4. Compare Wiggers, C. J.: A Physiological Investigation of the Treatment in Hemoptysis, Arch. Int. Med., July, 1911, p. 17.

5. Compare Wiggers, C. J.: Am. Jour. Physiol., 1914, **33**, 391; ibid., **35**, 140.

a variable lapse of time, may return toward normal. When this occurs, pulmonary arterial and effective venous pressures generally decline toward the normal level.

### PRACTICAL SIGNIFICANCE OF RESULTS

*Diagnosis.*—Pronounced types of shock offer no specific difficulty in diagnosis other than when the question of differentiation from progressive internal hemorrhage arises. The dynamic studies indicate that there is no essential difference in the circulatory failure following the two conditions, so that clinical differentiation on the basis of circulatory changes is not possible. The fact that in hemorrhage the hemoglobin percentage and red cell count are reduced by the dilution of the blood stream, while no such change has been reported in shock, may be of differential value, as suggested by Bainbridge and Bullen.[6]

The detection of the earliest stages of shock are of extreme importance, as in this phase the patient reacts more readily to remedial procedures. For this purpose the initial fall of arterial diastolic pressure has been proposed by Porter.[7] The results of this investigation indicate that, while a decline of diastolic pressure is the earliest evidence of circulatory failure in shock, it is not peculiar to it. To determine the fact that circulatory failure has begun, without a knowledge of the factor to which it is due, is of little value in the application of the proper remedial measures. We have thus far no circulatory sign or criterion by which the incipient state of shock can be recognized.

Before the state of shock has progressed very far, and while the circulatory condition is still amenable to therapeutic measures, the venous pressure has begun to decrease, as postulated by Henderson and his collaborators,[8] confirmed by Morrison and Hooker,[9] and again verified in this investigation. It is therefore important that the state of the venous pressure should be carefully followed in suspected cases of shock. For this purpose one may use the excellent apparatus of Hooker, when available and conditions permit its employment. It is even probable that some readily applied modification of the method suggested originally by von Frey may be sufficient. Von Recklinghausen[10] has suggested a single bedside test: One hand of the patient in the recumbent position is allowed to rest by his side, on the bed; the other placed on the thigh. If the veins in the former hand fill and in the latter collapse, normal pressure relations exist. If both collapse, venous pressure is low.

The combination of low venous pressure and a falling diastolic arterial pressure are conditions typical of circulatory failure in hemorrhage and shock alone. Their use in combination with hemoglobin determinations should be of clinical value in establishing the presence of circulatory failure due to shock.

*Treatment.*—In considering the treatment of circulatory failure in shock, the principles rather than the specific remedies can only be discussed. Experimental work shows that circulatory failure is initiated by a reduced peripheral resistance, but the condition does not become serious until the venous pressure falls. To counteract these mechanisms, the treatment must be directed to (1) overcome the reduced resistance, and (2) replenish the deficient venous return. For the former purpose, vasoconstrictor drugs, such as epinephrin, have been employed, either intramuscularly, intratracheally, as suggested by Auer and Gates,[11] intraperitoneally, as suggested by Cannon,[12] or intraspinally, as recently advocated by Auer and Meltzer.[13] To accomplish the latter need, intravenous infusions of physiologic sodium chlorid solution admixed with gum acacia, as recently suggested by Bayliss[14] and recommended by the British committee,[15] or graded intravenous infusion of glucose solutions, have been suggested by the experiments of Erlanger and Woodyatt.[16] The breathing of carbon dioxid mixtures has been recommended for a similar purpose, but on different grounds: by Henderson because they act chemically, and by Porter on the basis that the augmented respiration so induced mechanically favors the return of blood to the heart.

The fact is emphasized by this study that these and similar procedures aiming to augment venous pressure are based on principles that are sound, as regards circulatory failure in shock. They can be of little value in circulatory failure in any condition in which the venous pressure is already high. Thus, it would be of no avail to increase the venous pressure in forms of circulatory failure similar to that following the use of nitrites, in which a dilatation of peripheral arteries alone is concerned, for in such cases venous pressure is entirely adequate to supply the heart. A reduction of venous pressure by bleeding would seem to be a more rational procedure in the case of acute cardiac failure when a further increase in venous pressure might serve merely to overburden the already depressed heart. If circulatory failure on the battlefield, as held by Porter,[7] is indeed due to fat emboli, such as follow intravenous injection of oil, a further increase in venous pressure by any method is distinctly contraindicated, for it is precisely by the overdistention of the right heart, due to the high venous pressure, that the heart finally fails.

For these therapeutic reasons alone, the differentiation of circulatory failure, such as is found in surgical shock, from other types of circulatory failure cannot be emphasized too strongly.

6. Bainbridge and Bullen: Lancet, London, 1917, **2**, 51.
7. Porter: Boston Med. and Surg. Jour., 1916, **175**, 854; Compt. rend. Acad. d. sc., 1917, **165**, 164.
8. Henderson: Am. Jour. Physiol., 1911, **27**, 352.
9. Morrison and Hooker: Am. Jour. Physiol., 1915, **37**, 86.
10. Von Recklinghausen: Arch. f. exper. Path. u. Pharmakol., 1906, **55**, 484.
11. Auer and Gates: Jour. Exper. Med., 1916, **23**, 757.
12. Cannon: Boston Med. and Surg. Jour., 1917, **176**, 859.
13. Auer, John, and Meltzer, S. J.: The Administration of Epinephrin by Intraspinal Injections, THE JOURNAL A. M. A., Jan. 12, 1918, p. 70.
14. Bayliss: Arch. méd. belges, 1917, **70**, 793.
15. Report of British Committee on Shock, transmitted to Professor Howell.
16. Erlanger, Joseph, and Woodyatt, R. T.: Intravenous Glucose Injections in Shock, THE JOURNAL A. M. A., Oct. 27, 1917, p. 1410.

**Welfare Service During the War and Reconstruction Period.**—In the *Bulletin of the National Conference of Social Work* Robert A. Woods, president, says that the entire system of the regular and usual philanthropic activities throughout the country is having new and special burdens laid on it on account of the war. In spite of increased cost of operation and depletion of staffs by calls into military service, the accustomed work of community agencies is more urgently needed than ever before. Among the conditions which emphasize this are "the subtle disorganization of family life, the unrest and emotionalism which affects young men and women, the noticeable increase in juvenile delinquency, the presence of new dangers to public health and vitality owing to inadequate food and fuel, the danger of lowered industrial standards, the undermining of family economic well-being due to increase in prices beyond wages," etc. A warning is given that we should not only take care of present conditions in these respects, but that we should be prepared for the period of reconstruction, which at farthest, will soon be on us.

# INTESTINAL TOXEMIA OF HIGH OBSTRUCTION *

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This case of acute intestinal toxemia, the result of high obstruction, seems to me to be worthy of report. I am in debt to the commanding officer, Major Haverkampt, and the staff of the provisional base hospital, Fort Oglethorpe, Ga., for permission to report the case and the clinical data.

Experimentally, this toxemia has received considerable mention, especially following the work of Whipple, Sweet and others. So far as I am aware, it has not been frequently described as a clinical entity. A substance or combination of substances, the exact nature of which is undetermined, has been isolated from the closed loops of the upper intestine, notably the duodenum. In concentration, this substance is extremely potent, producing rapid death in experimental animals.

## REPORT OF CASE

*History.*—E. V., aged 23, a private, was admitted to the base hospital, Aug. 18, 1917, complaining of a feeling of discomfort about the umbilicus and a "rumbling in the bowels." This was of several days' duration, and was associated with nausea and vomiting. His general condition was only fair. His temperature was 99 F., pulse 80, and respiration 20. He stated that he had had a similar attack about one year before.

*Physical Examination.*—The patient was a white man, weighing 146 pounds. His tongue had a brownish coating. He had frequent hiccups, associated with nausea and intermittent vomiting of small amounts, which were bile stained. The abdomen was slightly distended. Peristaltic movements were plainly visible in the large intestine. The liver and spleen were not palpable. A mass was not palpable; there was no rigidity, but there was some tenderness on deep pressure.

*Treatment and Course.*—The patient's facies was that of a sick person, and yet the physical signs were very indefinite. This intensely anxious and sick facies continued more and more marked throughout the disease. On the night of his admission, a warm olive oil enema seemed to relieve him.

August 20, he had several attacks of periodic pain in the abdomen, beginning in the epigastrium, and extending to the umbilicus anteriorly and to the right flank posteriorly. Nausea and hiccups continued, with vomiting of large quantities of material, becoming more and more bile stained. This contained much mucus. Headache, at this time, was a prominent symptom. During several consultations, the question of obstruction was considered, but operative procedure was decided against. From August 20 to August 27, the general condition continued about the same, with a profound toxemia developing. This did not manifest an activity. There were no delirium, no meningeal symptoms, and no reactions. The temperature ranged between 97 and 98 F., but the patient was overwhelmed. The bowels moved freely three times during this interval, and on the 28th, following magnesium sulphate, they moved copiously. Vomiting and weakness continued. The patient was rational, remained quiet in bed, felt cold and chilly, and, between vomiting intervals, seemed as though all resistance to any factor had disappeared. On the morning of the 29th, a decided change for the worse took place. The patient became unconscious without delirium; he resisted movements but slightly, attempting to roll from side to side, especially to the left. The respirations were shallow but not rapid; the pulse was regular and of fair volume, while the extremities were blue, cold and dry. There was no evidence of shock or collapse, and there were none of the symptoms of active uremic toxemia.

The main phase seemed to be an intense asphyxia against which there was no reaction on the part of the individual, either in the way of an autogenous immunization or to very active drug stimulation. Strychnin, whisky and other stimulants had no effect.

The urine early showed a trace of albumin with many hyaline casts. The blood was negative for malaria, negative on culture, and the leukocyte count 6,000. Death occurred, August 29, at 5:30 p. m.

*Necropsy.*—One hour later, examination of the body revealed a well nourished man in whom rigor mortis had not appeared. The livor was moderate posteriorly and not present anteriorly. The pupils were dilated and equal, and the conjunctivae clear. The lips were dry and slightly cracked.

The chest presented no fluid. The heart was small, contracted and contained very little clot or blood. The musculature of the ventricle was bronzed with an underlying pallor and was associated with a flabbiness. The aortic intima was raised in an arborescence of ridges, and had lost some of its elasticity.

The right lung in its dependent position was solid and, on section, presented patchy pneumonic consolidations with intermingling areas of edema. The liver was large, blue and boggy and, on section, much blood exuded. The spleen was somewhat enlarged, slaty blue and, on section, the pulp was firm and the follicles were not visible. The stomach was considerably distended with gas, and a liquid, semidigested, bile-stained content. This distention extended through to the duodenum and along about 10 inches of the jejunum. At this point, an obstruction was encountered. This consisted of an intussusception. The intussusceptum was about 4 inches long, while the intussuscipiens was about 8 inches. The intestinal wall, at this point, was thick and boggy, and the mesenteric vessels were distended, with hemorrhage into the surrounding mesentery. The intussusception was easily straightened out, and a small mass in the intestinal wall was palpated. When the intestine was opened, the mass was found to be a fixed, well circumscribed, fleshy tumor arising from the jejunal mucosa, and was adenomatous in nature. The mucosa in the jejunum above and in the duodenum was thick, boggy and bluish black, but not necrotic. No other tumor masses were encountered.

The kidneys were large, swollen and blue with an underlying pallor; the cortex bulged decidedly on section, and was increased in width, with a moderate granularity. The capsule was adherent, and some of the larger vessel mouths gaped open.

*Diagnosis.*—The cause of death was duodenal toxemia due to high obstruction. The contributing factors were adenoma of the jejunum, producing intussusception, and acute hemorrhagic jejunitis and terminal hypostatic pneumonia. There were brown atrophy with acute parenchymatous myocarditis of the heart; intermediate intimal arteriosclerosis; healed apical tuberculosis; passive congestion of the liver; chronic diffuse splenitis (splenic tumor probably malarial), and acute parenchymatous nephritis with passive congestion and arteriosclerotic glomerulitis.

## COMMENT

The case is interesting from many standpoints, but especially from that of intestinal toxemia of high obstruction. It seems to be well established, at least experimentally, that there is a potent toxin following high obstruction. Experimentally, this substance has been isolated from purely intestinal origin. In this case, necessarily pancreatic and liver origin cannot be ruled out. In view of the fact that gross changes were not prominent in either one of the latter organs, while marked changes were present in the intestinal wall, it would seem safe to assume that the bulk of the toxin was of intestinal source.

The patient gave a history of symptoms at first mild and later becoming more intense. This was manifested by a severity in the illness unaccounted for on purely

* From the pathologic laboratory of the provisional base hospital, Fort Oglethorpe, Ga.

gross morbid changes. For several days before death, he had the facies of impending death. The poison was profound without being irritative. There was no associated delirium; there was none of the activity of meningeal irritation; there was not the reaction and collapse of hepatic or uremic toxemia. The forceful effects of asphyxia, noticed especially the day before death, puts the etiologic toxin in the class of potent chemicals.

The kidney insufficiency probably helped to accumulate the toxin, but, considered by itself, apparently played a minor rôle.

The physical question of the small tumor acting as the starting point for intussusception is not uncommon. In the records of the McManes Laboratory of the University of Pennsylvania there are several similar cases. These are mostly secondary tumors, as carcinoma and one very interesting case of secondary hypernephroma.

SUMMARY

1. The case illustrates a small adenoma of the jejunum as the starting point for an intussusception.
2. This intussusception resulted in high obstruction of the intestine, with marked changes in the intestinal wall at this point.
3. These intestinal changes produced a toxemia.
4. This toxemia was extremely potent, and ended in death.
5. The manifestations were those of an asphyxia without stimulative effects.

## DETERMINATION OF THE TYPE OF PNEUMOCOCCUS IN THE SPUTUM OF LOBAR PNEUMONIA

### A RAPID, SIMPLE METHOD *

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As a result of the observation that a boiling alkaline hypochlorite solution would not destroy the precipitable substance of bacteria, we developed a rapid method for the preparation of a concentrated precipitin antigen from bacteria.[1] The same method was found to be applicable to the preparation of a precipitin antigen from pneumonia sputum. In an appreciable proportion of specimens the type of pneumococcus present could be identified by this method in from one half to one hour after the receipt of the sputum. More recently, Mitchell and Muns[2] have reported a less complicated method for the preparation of an antigen from sputum. Their reports, as well as the results of our attempts to shorten the time in carrying out the mouse test according to the method of Blake,[3] indicated that many sputums are comparatively rich in soluble antigen. This being so, the solution of the pneumococci in the sputum, the object of the alkaline hypochlorite method, would be unnecessary.

Although the sand method of Mitchell and Muns is comparatively simple, we were certain, because of the facts given, that a still simpler method could be devised. One of the steps in the hypochlorite method involved the removal of the coagulable albumins. We had noted that the specimens yielding positive results were usually very rich in coagulable albumins, which one would expect to be the case in an inflammatory exudate of pulmonary origin. In fact, the presence of albumin has been used for diagnostic purposes, especially for the examination of sputums from pulmonary tuberculosis. A trial showed that sputums having the appearance of being actually raised from the lung coagulated more or less firmly when heated to 100 C. On this basis we evolved the following rapid method of preparing a precipitin antigen directly from sputum:

#### TECHNIC

From 3 to 10 c.c. of the sputum, depending on the amount available, is poured from the sputum container into a test tube. This is placed in boiling water for several minutes or longer until a more or less firm coagulum results, which will occur if the specimen is a suitable one. The coagulum is then broken up with a heavy platinum wire or glass rod, and saline is added. Just enough saline should be added so that, on subsequent centrifuging, there will be sufficient fluid to carry out the test. If too much is added, the resulting antigen may be too dilute. In some instances little or no saline is necessary, as sufficient fluid separates from the coagulum.

After the addition of the saline, the tube is again placed in boiling water for a few minutes to extract the soluble antigen from the coagulum, the tube being shaken several times during the heating. The broken clot is then thrown down by centrifuge, and the clear supernatant fluid used for the test. To hasten the appearance of the reaction and to obtain a reaction even should the antigen be dilute, we layer the antigen over the "type" serums, using the latter undiluted. Two-tenths c.c. of the three "type" serums are placed in narrow test tubes, and the antigen added from a capillary tube with a rubber teat. If the tubes containing the serum are tilted and the antigen dropped slowly on the side of the tube just above the serum, no difficulty will be encountered in obtaining sharp layers, as the undiluted serum is sufficiently higher in its specific gravity. The tubes are then placed in the water bath at from 50 to 55 C. and observed after several minutes.

If a fixed type was present in the sputum, and should the sputum have been rich in antigen, a definite contact ring is seen in the tube containing the homologous serum. With sputums less rich in antigen, the ring may develop more slowly, and it will be less marked. Some experience is necessary in detecting the less marked contact rings and in differentiating them from an apparent ring which may be confusing, if one of the serums is darker in color, giving thus a sharper contrast with the supernatant antigen. The true ring is more or less opaque, and this quality can be seen by tilting the tubes and looking at the area of contact against a dark background, for example, the lower edge of a dark shade raised to just above the level of the eyes. The advantage of the ring test is that a ring may be evident, whereas definite clouding or visible precipitate may appear only after longer incubation, or may be so slight even after an hour's incubation as to leave one in doubt. It is well to shake the tubes after twenty minutes, as many of the specimens will show definite clouding or precipitate either at once or on further incubation, thus checking the ring reading. All of the observations given in the accompanying table were read within one-half hour, and the majority were evident in less than ten minutes.

#### RESULTS

The table gives the results thus far obtained. The quality of the sputum is noted and also the degree of coagulation, as it is evident on comparing these data with the outcome of the test that the success of the test depends on the quality of the sputum submitted.

* From the Bureau of Laboratories, Department of Health, New York City.

1. Krumwiede, Charles, Jr., and Noble, W. Carey: Jour. Immunol., to be published.
2. Mitchell, O. W. H., and Muns, W. E.: Jour. Med. Research, 1917, 37, 339.
3. Blake, F. G.: Jour. Exper. Med., 1917, 26, 67.

The specimens examined are the routine samples submitted to the laboratory by private physicians, and no special care was taken in the selection of the sample. The results with the sand method of Mitchell and Muns, the ring test being used, are given whenever sufficient material was available for duplicate tests. A few examinations by the method of Avery[4] are also given because they are based on the results of broth cultures incubated from five to eighteen hours. The method, therefore, may be employed as a check method, even though the tubes are inoculated too late for examination on the same day. Further observations are necessary, however, as to the possible disturbing influence of overgrowth by other organisms after a longer period of incubation than five hours, which might lead to a negative result. Sterile citrated horse blood was employed in place of the defibrinated rabbit blood advised by Avery. The layer method was not used with the Avery method, as the broth does not layer well. The results were finally checked by mouse inoculation or the isolation of pure cultures directly from the sputum. All the Group IV results were checked by mouse inoculation, to exclude the possibility of the presence of small numbers of pneumococci of the fixed types.

RESULTS *

| No. | Quality of Sputum | Coagulation | Coagulation Method | | Sand Method | | Avery Method | | Result of Final Check Test: Type or Group |
|---|---|---|---|---|---|---|---|---|---|
| | | | Type | Degree of Reaction | Type | Degree of Reaction | Type | Degree of Reaction | |
| 1 | Good | + | III | + | III | + | .. | .. | III |
| 2 | Good | + | III | + | III | + | .. | .. | III |
| 3 | Good | + | I | + | .. | .. | .. | .. | I |
| 4 | Good | + | III | + | III | + | .. | .. | III |
| 5 | Mucoid | — | — | — | — | — | .. | .. | I |
| 6 | Good | + | II | + | II | ± | II | ± | II |
| 7 | Good | + | III | + | — | — | .. | .. | III |
| 8 | Good | + | — | — | — | — | .. | .. | IV |
| 9 | Good | + | II | + | II | + | .. | .. | II |
| 10 | Slimy | — | — | — | .. | .. | .. | .. | II subgroup |
| 11 | Fair | ± | I | ± | I | × | I | × | I |
| 12 | Salivary | — | — | — | — | — | — | — | IV |
| 13 | Good | + | II | + | II | ± | II | + | II |
| 14 | Good | + | I | ± | I | × | .. | .. | I |
| 15 | Salivary | — | — | — | — | — | I | + | I |
| 16 | Good | + | I | + | I | + | I | + | I |
| 17 | Good | + | II | + | .. | .. | II | + | II |
| 18 | Fair | + | III | + | .. | .. | — | — | III |
| 19 | Good | + | — | — | .. | .. | — | — | IV |
| 20 | Good | + | I | + | .. | .. | I | + | I |
| 21 | Salivary | — | — | — | .. | .. | .. | .. | I |
| 22 | Good | + | — | — | — | — | — | — | IV |
| 23 | Salivary | — | — | — | .. | .. | — | — | Streptococcus |
| 24 | Mucoid | — | — | — | — | — | — | — | Streptococcus |
| 25 | Good | + | III | + | III | + | .. | .. | III |

* The symbols indicate, for degree of reaction: +, marked reaction; ±, fair reaction; ×, slight reaction; for type: —, no reaction; .., test not done.

The coagulation method failed in four instances in which fixed types were present, but in each case the sputum was an unsatisfactory sample, which was evident on inspection, and coagulation also was absent. If coagulation does not occur, there is little use in proceeding with the method. In some instances in which coagulation has been slight and the extract opalescent, dilution of the extract has cleared this sufficiently so that a ring reaction could be seen. In these instances, naturally, the content of antigen in the sputum was large. We have attempted to coagulate the mucoid types of sputum by adding egg albumin. This has failed, as on subsequent extraction with saline the mucus goes into solution, and a clear antigen cannot be obtained.

We have obtained in this series somewhat more successful results with the coagulation method than with the sand method. To our mind the advantage of the former is the lessened labor in performing the test, and the greater cleanliness. It would seem that the rapid method, checked by the Avery method, would suffice for the majority of specimens if they are satisfactory in quality. The only necessity of mouse inoculation would be when both give no reaction with type serums, or when the specimen is obviously unsatisfactory for the foregoing methods. Even without mice, which are difficult to obtain at present, the two methods could be employed with considerable success as a preliminary to serum administration. With satisfactory specimens, few cases would fail to receive the serum because of unsuccessful tests. For statistical purposes as to incidence of type, the methods naturally would give somewhat incorrect results.

The advantage of the rapid method, that one can supply the messenger delivering the sputum with the appropriate serum in most of the cases for which type serums are available, and the great gain to the patient through earlier administration of the serum, need little comment. These advantages should help materially in popularizing the administration of serum to patients outside of the larger hospitals.

4. Avery, O. T.: Determination of Types of Pneumococcus in Lobar Pneumonia, The Journal A. M. A., Jan. 5, 1918, p. 17.

## HEMORRHAGIC DISEASE IN NEW-BORN

### TREATED BY INJECTION OF CITRATED BLOOD IN THE SUPERIOR LONGITUDINAL SINUS

OSCAR BERGHAUSEN, B.A., M.D.
CINCINNATI

The following case report may be of interest to the general profession, since it shows that the superior longitudinal sinus may safely be punctured when bleeding occurs in the new-born, and that citrated blood may be successful in controlling the hemorrhage. This method was employed as a last resort, after I had tried without success to introduce the blood through a prominent vein at the elbow and on the left side of the neck. A fair-sized steel needle was introduced in the sinus, and when blood began to flow, between 150 and 200 c.c. of the father's blood in 2 per cent. sodium citrate solution was introduced rather slowly, the blood continuing to drop from the needle whenever the syringe was detached. The method is so simple that it probably will become the one of choice in the future. Citrated or whole blood can readily be introduced in this way, and the amount of blood necessary can be readily determined by the improvement in the condition of the patient, because the effects are usually immediate. A pale, apparently lifeless infant is quickly transformed into a rosy and crying baby.

Subsequently it was learned that Knox[1] had previously employed the same method successfully in treating an infant which had passed from 3 to 5 ounces of tarry blood-stained material, evidently a hemorrhage from the intestinal tract. Knox used 50 c.c. of the mother's blood in 60 c.c. of sodium citrate solution, introducing 15 c.c. of the mixture in the longitudinal sinus and the rest in small quantities intramuscularly

1. Knox, J. H. M., Jr.: Case of Hemorrhagic Disease in New-Born Treated by Indirect Transfusion, Arch. Pediat., 34, 771.

into the buttocks, the improvement being gradual. In this case intramuscular injections of 20 c.c. of the noncitrated paternal blood had been of no avail, but the injection of between 150 and 200 c.c. of citrated paternal blood in the longitudinal sinus was followed by immediate improvement.

REPORT OF CASE

Jan. 13, 1918, Mrs. R. S., aged 24, after being in labor three days, was delivered of a male child, forceps being necessary. The forceps injured the soft parts over the back of the head, over the left eyebrow, and the inner side of the upper lip. The bleeding could not be controlled, although sutures, epinephrin, a blood-coagulating substance and pressure were used locally. Neither parent could give a history of a bleeder in the family. Twenty-four hours after the delivery, Dr. Charles Heisel asked me to see the patient. At this time 20 c.c. of the paternal blood was introduced intramuscularly into the buttocks and the back. The bleeding had not ceased by the following morning, when the condition of the child made a transfusion of blood necessary. About 250 c.c. of the father's blood in 25 c.c. of 2 per cent. sodium citrate solution were collected. Fully 50 c.c. of this mixture were lost in attempts to introduce the blood after the vein at the elbow and on the left side of the neck had been laid bare. As a last resort, it was determined to puncture the superior longitudinal sinus, although a recent writer[2] had warned against such a procedure in a case of hemorrhagic disease in the new-born. After the blood began to drop from the needle, from 150 to 200 c.c. of the citrated blood were introduced, the blood continuing to drop from the needle each time that the syringe was detached. Improvement in the condition of the infant ensued while the operation was in progress. January 15 and 16, the rectal temperature measured 102.2 at 9 a. m., but on the morning of the 17th it measured 98.2. The bleeding has not recurred. The stool was normal throughout. The urine was scanty during the first day, but was passed freely after the transfusion.

19 West Seventh Street.

## *Military Medicine and Surgery*

## SOME HERNIAS THAT DISQUALIFY FOR MILITARY SERVICE, WHETHER OPERATED ON OR NOT

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Men who have been operated on successfully for inguinal hernia and show no sign of recurrence at the time of examination are accepted for general military service, both among applicants for enlistment and among registrants for the selective service. It is now under consideration to accept both applicants for enlistment and registrants in the selective draft who are suffering with inguinal hernia of certain types, and to subject them to operation after they have become soldiers. This will undoubtedly admit many men otherwise physically fit into the Army.

There is, however, a small group of hernias, which can be easily recognized at the first examination, for which up to the present time operations failed to result in a cure in from 20 to 50 per cent. of cases. I called attention[1] to this small group of inguinal hernia in 1899. Among 243 cases of inguinal hernia, this type occurred in eleven instances, about 4.5 per cent. Among these eleven cases there were six recurrences, more than 50 per cent., in from six weeks to six months after operation. In the larger group, 232 cases, there were only two recurrences, less than 1 per cent., and in these two cases the wound had broken down.

In this smaller group the hernia need not necessarily be large, or present any of the signs and symptoms of the so-called complicated hernia. This type of inguinal hernia, however, can be recognized when the patient is examined lying flat on his back. If the finger is pressed against the scrotum and pushed up into the external ring, as the index finger passes through the external ring (the hernia having been reduced), in the larger number of cases it meets an obstruction (the conjoined tendon) and is deflected upward and outward, following the course of the inguinal canal. In this smaller group the index finger meets no obstruction, but enters at once into the peritoneal cavity, and in some cases the opening is so large that when the index finger is flexed it can palpate the pubic bone in the region of the symphysis. Now and then one gets this impression to a slighter degree; but if the patient is asked to raise his head, the contracting rectus muscle pulls tight the relaxed conjoined tendon, and the finger of the experienced examiner at once detects that the conjoined tendon is not absent or obliterated, but simply relaxed.

In those cases in which this examination detects the complete absence of the conjoined tendon, the ordinary operation for inguinal hernia, according to my investigations up to 1899, failed to cure in about 50 per cent. of the cases.

The majority of operators today admit about 5 per cent. of recurrences in all cases of hernia. I am of the opinion that the majority of these recurrences are not due so much to the fault of the ordinary operation as to the type of the hernia and the absence of the conjoined tendon.

After this observation in 1898, I devised and published a description of the transplantation of the rectus muscle to take the place of the conjoined tendon — a method independently worked out by Woelfler in 1898. Later, Halsted modified the transplantation of the muscle by turning down a pedunculated flap of the anterior sheath of the rectus. Later observations of these cases have shown that the percentage of recurrences has been reduced to about 15 or 20; the exact figures have not been worked out. But there is no doubt that some recurrences still take place.

For this reason I take this opportunity to call attention to this group, with the hope of getting the opinion of surgeons with large experience in the operation for hernia.

When we have all the evidence at hand, we may be able to advise the surgeons who will have charge of this large operative work to be on the lookout in their examinations for this group, and to discharge these men from general military service. It is my opinion that it is possible to select this group at the complete examination at the cantonment, and these applicants or registrants should be rejected, saving the government the expense incidental to the operation and later discharge for a recurrent hernia.

I would appreciate the expression of opinions by my colleagues on this point.

904 North Charles Street.

2. Unger, L. J.: Transfusion of Unmodified Blood, THE JOURNAL A. M. A., Dec. 29, 1917, p. 2159.

1. Bloodgood, J. C.: Johns Hopkins Hosp. Rep., 1899, 17, 277.

**Medical Inspection.**—The authority which has the right to compel attendance at school has the added duty of insisting that no harm shall come to those who go there.—*Health Bull.*

# VALUE OF ROENTGEN RAY IN DIAGNOSIS OF PULMONARY TUBERCULOSIS IN WAR TIME

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The entire medical profession has for some months been deeply interested in the many problems connected with the war. Although later questioned, early reports of an alarming amount of tuberculosis in the French army among the men in the trenches, as well as those behind the lines, focused attention on this phase of the medical problem. The question of excluding the tuberculous from the army, especially from that part destined for overseas activity, has seemed to many to be most pressing at this time.

It is clearly evident to any one who has made even a cursory inquiry into the medical examinations of the national army that no army has ever been so well examined. My object is not to criticize but to attempt to show how, along one line, even greater efficiency might be obtained.

The early diagnosis of early pulmonary tuberculosis is always a difficult problem, and among recruits difficulties are heaped on difficulties. Symptoms, either real or imaginary, lead the patient to the physician, and the latter by various examinations seeks evidence confirmatory or contradictory of his suspicions, based certainly at first on symptoms. In fact, some hold that symptoms, without physical signs, demand treatment, while physical signs, without symptoms, require only careful watching. Some recruits, as Bushnell[1] says, are so eager to go to France that they conceal the fact that they have had tuberculosis. Others may conceal it for a time in hope of being mustered out before being sent into active service on account of "developing," as they would have it believed, pulmonary tuberculosis in the line of duty. A third group may not wish to go at all, and symptoms are developed out of the whole cloth. These and still other factors cause many to believe that previous symptoms are of little weight in the diagnostic scale. Men with definitely evident symptoms at the time of examination need no mention in this discussion.

With symptoms and previous history of such uncertain value, we are thrown back on objective findings to exclude pulmonary tuberculosis from the Army. It is not my intention to discuss physical signs; but no one will deny, I am sure, that fairly extensive pulmonary disease may exist with few or no physical signs. Such instances are luckily not frequent; but slight physical signs were barely to be discovered by the method of examination I have seen practiced at Plattsburg and Camp Devens, unless hypersecretion of mucus was so located as to be discoverable on coughing.

According to Bushnell,[1] an examiner can go over twenty-five men in an hour, and in the Army could later re-examine the suspects more carefully. I have watched the procedure at Plattsburg and have practiced it at Devens, and it may be of some interest to describe it briefly as I saw it practically applied. At Plattsburg the men were of a higher order of intelligence—all were in hopes of obtaining commissions. At a certain hour the men were stripped to the waist and formed in as many lines as there were examiners, three in this instance. An orderly asked each man if he had ever had pleurisy, pneumonia, had spat blood, had cough lasting over a month, or had any tuberculosis in his family. If an affirmative reply was received to any of these questions, or if he seemed to be in poor shape, the man was requested to report later for a special examination. The men remaining in line were instructed how to exhale, cough and inhale. The chest was auscultated, after the man had coughed roughly about twenty-five to thirty times, on the front and back, in a period of from one to two minutes. If no râles were heard, the man was passed; but if râles or suspicious sounds were detected, he, too, was ordered back for special examination. These special examinations were made under more favorable conditions, and I do not believe that many men with adventitious sounds in their chests escaped detection. At Camp Devens all men with suspicious histories or suggestive physical signs or poor physique were requested to wait for their examination or a re-examination until the others had been examined. I do not wish to belittle the excellent examinations that have been and are being made in many camps; but I should like to draw attention to the fact that medical officers doing such work may grow stale; that it is very difficult to make some intelligent men cough correctly, and that it is impossible to explain the matter to an ignorant man or one who does not speak English, French or German. These conditions may be unusual, but should be considered.

For these reasons, which have no doubt occurred to every one, the value of the roentgen ray in the Army examinations has been widely discussed. Some would have had every man in our Army examined by roentgen ray, others only those with suspicious symptoms, while a third view was to reserve it for those with suspicious physical signs. If thousands of men were to be examined by roentgen ray and hundreds of thousands of dollars expended on such work, it would become necessary to show very conclusively that it was worth the price.

In the first place, our medical experience along these lines has pursued some such course as this: (1) The occurrence of symptoms; (2) the seeking of medical advice, and (3) the taking of the roentgenogram. Along this well beaten track many have passed, and our data are backed by years of experience. So far as I know, few oppose the roentgenographic study of men with suspected or even definite pulmonary physical signs, and I believe that there is a roentgen ray outfit at each cantonment to do such work. At two of the officers' training camps, however, there has been none, and we luckily had an opportunity of studying twenty-one men with physical signs, or suspicious symptoms, from the first Plattsburg encampment. To them I shall refer later.

But such experience as I have mentioned does not cover the case under consideration, for in the National Army we may assume that in from 90 to 95 per cent. of the instances we are dealing with men in apparently good health and without symptoms. What data have we of roentgenographic studies of such individuals? Unfortunately, I have been able to find but one study, and that only on fifty physicians and medical students. This study, by Hamman and Baetjer,[2] revealed by physical examination eleven as normal, eighteen with right apical signs, twelve with left apical signs and nine as having both sides involved. A study of the physical examinations as published showed only one or two with the indeterminate râle, but a large number with fine

1. Bushnell: Am. Rev. Tuberc., 1917, 1, 325.

2. Hamman, Louis, and Baetjer, F. H.: Pulmonary Physical Signs and Roentgen-Ray Findings in Healthy Adults, Arch. Int. Med., November, 1914, p. 757.

râles, slight dulness or some variation from normal of the breath sounds. The plates taken were flat plates, and the results as published would not, in the light of our knowledge of today, suggest strongly that more than two of the forty-six persons examined by the roentgen ray had definite roentgenographic evidence of pulmonary tuberculosis. Major Baetjer has been good enough to let Mr. Sampson and myself go over some of these plates. When we compared them with our own and with those of Major Cole we found that in the main all of us agree, for, as already mentioned, Baetjer had found only two definite cases.

It is unnecessary for me to point out that roentgen ray plates are shadowgraphs; that the flat plate is the summation of all the shadows that lie in each plane of the rays, and that stereoscopic plates resolve more or less these summations of shadows into their constituent shadows, and at times cause to disappear what might have been considered to be an increase over the normal shadows.

To establish a norm in roentgen ray work is most important. Many have become very expert in reading flat plates; and indeed all the original work was done with flat plates. However, in very early cases slight shadows are often puzzling, and shadows lying under a rib are often difficult of interpretation. The stereoscope aids greatly in this, for the shifting of the tube separates some shadows from those of the ribs and clavicle, and a thickened root shadow may resolve into normal constituents. I have mentioned these facts because there has been much difference of opinion. Some have held that in Army work only stereoscopic plates should be made, together with a flat plate taken in the opposite direction. Another group has affirmed that a single flat plate is sufficient.

Major Cole,[3] whose untiring efforts in the interest of this work cannot be too highly praised, took roentgenograms of 100 men to determine if one flat plate would reveal lesions sufficiently gross to arouse the question of possible rejection. Posterior-anterior stereoscopic and flat anterior-posterior plates were taken and it was decided that the single flat plate was sufficient for work in which only gross lesions need to be detected. It should, however, be borne clearly in mind that many are just as sure that in the study of a patient stereoscopic plates are always to be desired, for the reasons previously mentioned. Fortunately, they are not necessary here, for they require five times as long to take, develop and read as a single flat plate. The same objection applies more fully to the use of the fluoroscope, which, in view of its uncertainties of interpretation and other objections, seemed to be unsuitable for this work.

### STUDIES OF THE NEW YORK NATIONAL GUARD

This study of 100 men was made on some members of the Twelfth Regiment of the New York National Guard, which had seen service on the Mexican border and had been subjected to several examinations by Army medical men.[4] Some of them, however, had been recruited since the regiment returned from the border. While the physical examination of the lungs may not have been as searching as if performed by lung specialists, nevertheless the strict requirements, such as the requirement of weight, must have ruled out many doubtful recruits. It was, however, decided to subject these 100 men to a careful, independent, comparative study of the roentgen ray and pulmonary physical findings. Dr. James Alexander Miller, with a staff of able assistants, made the examinations. In all, roentgenograms of 100 men were taken, and in ninety-two cases the plates were satisfactory for study. Six men were roentgenographically positive for tuberculosis, one possibly had sarcoma, and one possibly Hodgkin's disease. In one the presence of a cavity was entirely overlooked by the physical examiners, and three men showed physical signs without roentgenographic findings. The physical examination and the roentgenogram agreed in five cases, and all eight were rejected. Major Baetjer (and a number of others, among them J. A. Miller, E. R. Baldwin and H. W. Biggs) agreed with Major Cole's interpretation of those plates that showed tuberculous changes.

It is easy to come to the conclusion, after a study of these results, that if only from 4 to 6 per cent. of the men recruited were proved tuberculous and liable to relapse, the number was great enough to justify considerable expense to exclude them from the Army. In 600,000 men, for example, 4 per cent. would total 24,000, and the pensions such men would and should receive might easily run into the millions of dollars.

These facts were presented to Governor Whitman, who has ever had a keen grasp of public health matters, and he set aside $1,500 for a study of a thousand men in the Sixty-ninth Regiment of the New York National Guard. Major Cole was again in charge of this study, and was assisted by Major LeWald and a number of other experienced men. It was hoped by this experiment to demonstrate the posibility of taking plates of every soldier in the National Army, and to do so as rapidly as the physical examination of the lungs could be made.

The study showed that with two staffs or groups of roentgen ray men a thousand plates could be taken, developed and read in a day. The work would be rough, but many lesions would no doubt be revealed that would otherwise escape detection, and I refer not only to pulmonary lesions, but to osseous, vascular and cardiac lesions as well. The mechanical detail of this work will no doubt be reported by Major Cole at some later time. In the plates of 1,030 men of this regiment, about 1,000 were useful for study. Of these, thirty-four were found to have such definite parenchymatous shadows that Major Cole and Lieutenant Allison would advise rejection. The plates of thirty-two others strongly suggested definite tuberculous lesions. Baldwin, Heise, Sampson and I went over these plates very carefully, and on account of changes which we interpreted as old lesions, would reduce Cole's figure of thirty-four to twenty-eight, and add the six to the doubtful cases, making thirty-eight. These six cases and some of the other doubtful plates, had they been found in patients with symptoms, could have been interpreted, no doubt, as showing definite tuberculous changes. Dr. H. M. Biggs and Major Lewis Connor agreed in the main with these interpretations.

The physical examination of these men was undertaken by a group of good clinicians under Major Connor of Cornell. The results of their examinations was most interesting. Of the entire regiment (about 2,200 men), they certified six for rejection on account of pulmonary tuberculosis. Of these six, four showed

3. Major Lewis Gregory Cole is chairman of the Committee on Roentgenology of the Medical Advisory Board of the National Council of Defense.

4. This study of members of the New York National Guard was made possible through the interest and cooperation of General Stotesbury and Major Berry of the New York National Guard. It was conducted under the auspices of the Subcommittee on Tuberculosis of the Medical Advisory Board of the National Council of Defense. To the suggestions of the chairman of this committee, Dr. H. M. Biggs, many of the studies are due.

lesions in the roentgen ray plate and were rejected, while the other two had negative plates and were accepted. Of the four rejected, only one fell in the group of the thousand already examined by roentgen ray, and his plate revealed advanced disease. In other words, in the 1,000 men examined by roentgen ray, thirty-four (accepting Cole's readings) were positively tuberculous and should have been rejected, but on physical examination only one was discovered. At Dr. Biggs' suggestion, Major Connor and his assistants re-examined twenty-six of these thirty-three men. The others were away or in the hospital and could not be re-examined. The men were of course all made to cough, and each was examined by three physicians. Abnormal physical signs were discovered in one or more men, and they were rejected. Three others were rejected also on the history of previous symptoms.

This great discrepancy between roentgenograms and physical signs emphasizes the fact either that in apparently healthy men, shadows on roentgenographic plates do not bear the same significance that they do in patients with symptoms, or that in many apparently healthy men roentgenographic study will reveal tuberculous pulmonic changes before symptoms of such intensity as to attract attention arise and long before physical signs indicative of pulmonary disease are to be discovered. The latter assumption may explain those sad cases in which the patients suddenly develop extensive physical signs and pass, so to speak, at a bound from a stage of doubt to a stage of well developed disease. It might be argued, as it has been, I hear, in the West, that in those doubtful cases a very rigorous training at first would soon suffice to bring out the fact whether or not tuberculosis was present in a cryptic form. No doubt this would happen, and there is no doubt, too, that a man useful to society and self-supporting in his occupation would be rendered thereby an invalid and at times a public charge. The question, then, concerns not only the Army but also the whole body politic.

### COMPARISON OF FINDINGS

Reference has been made to the examination of the men at Plattsburg who, during the first encampment, were examined at or near its close. These men had been subjected to all the physical exercise incident to active service, and probably more, but had not been exposed to much inclemency of weather, such wetting and chilling as occurs, for instance, on the Belgian front. What a wealth of information on the relation of roentgenographic shadows to tuberculosis and exercise we should have had if a roentgenogram of every man had been made! How much good to our future generations might have resulted if we are to subject all our boys to military training! At the first Plattsburg camp about 4,445 men were examined, and twenty-one were referred to Mr. Sampson for roentgen ray examination. Of these, nine were found to have definite parenchymatous lesions, and three were later disqualified for service abroad; but only three were rejected, while three received no commission but were dropped and were not rejected. All these men were examined near the end of their training, and probably some men with positive cases had already resigned.

It is of great interest to compare the roentgenographic findings in these men with those discovered by Baetjer in his forty-six and by Cole in his thousand. The majority of the Plattsburg men had definite physical signs, some fairly extensive. The roentgenograms of the nine positive cases all showed a definite parenchymatous lesion, while a study of Baetjer's cases revealed only two with such a lesion. In Cole's thousand cases we find thirty-four (or twenty-eight) with such lesions. Granting that had Hamman and Baetjer's patients been recruits they would have been rejected by physical signs and roentgenograms, 2 or 4 per cent., or even 1 or 2 per cent., it is interesting to compare these figures with the others, 0.2 per cent. for the Plattsburg cases and 0.4 per cent. for the Sixty-ninth Regiment.

These, so far as I can determine, are the direct data on which we must form our opinion as to the value of the roentgen ray in pulmonary tuberculosis in the Army.

Mr. Sampson and I have attempted to compare some of our definite cases at Trudeau with these. We selected ten patients with as early parenchymatous lesions as we could find, and found that only three of them had never had tubercle bacilli in the sputum. We then replaced these by three others who had had positive sputum. It is not an easy matter to separate these plates from those of Baetjer or Cole, for they are all much alike. It might be argued from such plates that they mean little without symptoms, and much with; that the owners have a tuberculosis that only by chance becomes clinical and of moment, and that hence it is a good chance that such plates are of small import. It is of interest to note that these plates all fall in that group of Bushnell's which he says must depend on positive physical findings for rejection. Of our ten patients, only three had moderately coarse râles, and so seven would have been passed, of whom some had tubercle bacilli in their sputum within two months of the time of examination. It is curious, further, that we do not see more of such cases, when we take plates of patients with slight or no symptoms, on account either of their nervousness or of possible exposure to infection. The great incidence of pulmonary tuberculosis between the ages of 21 and 31 should also be kept in mind.

To consider this problem from a business standpoint is interesting. Whether or not we accept as correct Major Connor's decision to reject four more men out of the thousand of the Sixty-ninth Regiment examined roentgenographically, we cannot deny that the roentgen rays led him to the consideration of this step. If he was right, and I am convinced that he was, the roentgen ray plates led to the detection of 0.2 per cent. more men with tuberculosis than were discoverable by careful physical examination. If we conclude that these men would have broken down with pulmonary tuberculosis either during training or on active duty overseas, we can readily see what an economy would result were such methods with similar results to be applied to the whole National Army. If we accept the number of men in camps as 1,000,000, 0.2 per cent. would be 2,000 men. It is easy to see how their pensions and keep would mount up if, say, they lived five years, and cost the country in pensions and maintenance $1,000 a year. The total would be $10,000,000, or 5,000 times what it would have cost to prevent the development of the disease.

It is taken for granted that each cantonment has an expert roentgenographer to examine all suspected patients among the National Army; but Major Cole is of the opinion that a rather larger percentage of the roentgenographers connected with the Army are not

experts in the interpretation of roentgenograms of the lungs.

It is taken for granted that, like the French Army, our Army will have clearing stations behind the front lines, to which all soldiers with suspected pulmonary tuberculosis will be sent. Here an expert roentgenographer is as necesary as an expert in tuberculosis, or as an expert in nose and throat disease. Major Rist tells me that in the French clearing stations 90 per cent. of the men admitted as tuberculous are returned to the front as having no tuberculosis; and Major Cole has found only 10 per cent. of the men referred to him from the camps about New York City with a diagnosis of probable pulmonary tuberculosis to show evidence of it on roentgen ray plates.

It is taken for granted that all institutions to which soldiers will be sent on their return from overseas service will be equipped with efficient roentgen ray staffs. I am told that in Canada the most difficult problem is to be able to decide whether or not some soldiers returned for pulmonary tuberculosis are really suffering from it.

If these assumptions can be taken for granted, it remains for us to consider the advisability of examining by roentgen ray a large number of men in our Army. I had planned to discuss the practicability of such a measure, into which Major Cole has gone in detail. I can only say that he considers it perfectly practicable and no more time consuming, and even much less, than the physical examinations made as I have described. The expense for each man amounts to the pay for a private for one day—one dollar. The question of storage is of no moment, for 45,000 plates can be stored on shelves about a room 15 feet square.

### CONCLUSIONS

To summarize the many reasons that have been assigned for using roentgen ray plates in the examinations of the National Army, it may be said that among others they are:

1. To accept men with acute and nonimportant bronchitis whose physical signs may simulate those of pulmonary tuberculosis.
2. To reject men with advanced pulmonary tuberculosis whose physical signs suggest a slight lesion.
3. To verify the presence of lesions indicated by physical signs.
4. To detect deep seated acute or subacute pulmonary tuberculosis when only indefinite physical signs exist.
5. To reveal various nontuberculous pulmonary diseases in early stages.
6. To detect and verify cardiac, arterial and osseous changes.
7. To reveal old basal pleurisies.
8. To establish a permanent record of each soldier.

The value of antityphoid vaccination had not been conclusively proved by Sir Almroth Wright's work in South Africa, according to a recent statement by the late Major Janeway, and it remained for Colonel Russell of the United States Army, by his work with the vaccine on the Mexican border, to establish its great scientific and practical value. Objections to the use of the roentgen rays in the United States Army have been made for the reason that this is no time for scientific experimentation. It is inconceivable that Colonel Russell's work encountered no opposition, but it has been the means of saving thousands of lives. It was a scientific experiment based on sound premises and redounds to the glory of the United States Army. Some venture to believe that today the premises on which the use of the roentgen ray in the Army depends are sound and everyone wishes to see the Army win new laurels by demonstrating its value. This brings us to the important point of reliability of roentgenograms. That some lesions may escape detection may be granted, for the time being. That the shadows we accept as definite for pulmonary tuberculosis can be simulated by those of other diseases cannot be denied; but they do so so rarely that we may disregard them. This leads us, for example, in Cole's cases, to a diagnosis of parenchymatous pulmonary tuberculosis in thirty-four (twenty-eight) cases undiagnosed by ordinary clinical examination. The results at Plattsburg would lead us to suppose that most of these men will go through training in good shape. What will happen when life in rainy weather in flooded trenches begins is only conjecturable. Rhinitis, coryza and bronchitis are, from all accounts, very frequent. The injurious effects of repeated severe colds, whether due to adsorption of antilytic substances in the blood by the various organisms which may penetrate into the blood stream under such conditions and so subject the latent focus to lysis, or to other causes, the fact remains that repeated attacks of these minor ailments do bring about relapse in some patients with pulmonary tuberculosis. From our studies of patients with parenchymatous lesions, we fear greatly that the subjection of the men to such conditions may result disastrously, and we would hesitate to recommend men having such plates for overseas service. Such beliefs are based on a study of plates taken of persons with symptoms either real or imaginary. For the benefit of future drafts, for the benefit of the whole civil population, I feel that I cannot urge too strongly that roentgenograms be taken of at least 10,000 men of the National Army. I would not suggest now that men with only parenchymatous roentgen-ray lesions be discharged at this time, but that a future study of the results of the strain of army life on this group and on the group without roentgen-ray pulmonary changes be made and definite conclusions drawn, conclusions which will, I believe, be of great value.

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**Report of Bureau of Mines.**—The annual report of the director of the Bureau of Mines for the fiscal year ended June 30, 1917, among other things, sets forth prominently the work and researches of the bureau on problems connected with preparation for and prosecution of the war. Among them are problems relating to the nitrate supply, raw materials for sulphuric acid, war gases and gas masks, nickel, manganese, mercury and potash supplies, petroleum products, coal, explosives, etc.——Among the more important achievements of the year were the following: More than 4,800 miners were trained in mine rescue and first aid work, covering twenty-three states. By the end of the year 46,873 miners had been trained by the bureau since its organization. Sixty-three accidents, fifty-seven of which were at mines, were investigated, and 103 men were rescued. At nineteen of the sixty-three accidents, breathing apparatus was worn. Twenty-two rescue and first-aid contests were held throughout the country. More than 39,000 miners attended lectures on these subjects. An interesting finding from tests made is that lime can be used instead of caustic soda in the regenerators of oxygen breathing apparatus. Further improvements have been made in the Gibbs oxygen breathing apparatus. First aid methods and materials, as well as mine-rescue methods, were revised and standardized. Other studies relating to mine safety concerned explosive dusts and gases, permissible explosives and mined fires.

# NATURE AND TREATMENT OF WOUND SHOCK AND ALLIED CONDITIONS

**[EDITORIAL NOTE.—In August, 1917, the Medical Research Committee (Great Britain) appointed a Special Investigation Committee to undertake the coordination of inquiries into surgical shock and allied conditions, with a view to the better correlation of laboratory and clinical observations. The following were asked to serve on this committee:**

Prof. E. H. Starling, M.D., F.R.S. (Chairman).
Prof. F. A. Bainbridge, M.D., F.R.C.P.
Prof. W. M. Bayliss, D.Sc., F.R.S.
Prof. W. B. Cannon, M.D. (Harvard University).
Lieut.-Col. T. R. Elliott, M.D., F.R.S., R.A.M.C.
John Fraser, M.D., F.R.C.S. (Edin.).
Prof. A. N. Richards, Ph.D. (University of Pennsylvania).
Prof. C. S. Sherrington, M.D., Sc.D., F.R.S.
Col. Cuthbert Wallace, C.M.G., F.R.C.S.
H. H. Dale, M.D., F.R.S. (Secretary).

**The first report on "Intravenous Injections to Replace Blood" was published as a special Bulletin, Nov. 25, 1917. The second, on "Investigation of the Nature and Treatment of Wound Shock and Allied Conditions," given herewith, was issued for official use, Dec. 25, 1917, and Sir Walter Fletcher, secretary of the Medical Research Committee, has given his consent to the publication of the papers in The Journal, as has also the military censor.**

**In sending the report, Dr. Cannon writes:**

"The work was done in a casualty clearing station a few miles from a part of the line where there has been constant fighting for three years with scarcely any change. Only the most serious cases which could not be reasonably moved any farther back were left with us for the town was repeatedly shelled and the station was twice bombed by aeroplanes during my stay. London, with its air raids, is a Paradise by comparison."

**The series includes six articles. On account of lack of space, two or three tables are omitted from The Journal. The first three articles follow in this issue of The Journal; the rest will appear next week. The complete series will be reprinted as a pamphlet, which will be sent on receipt of 10 cents in stamps.]**

## CLINICAL STUDY OF BLOOD PRESSURE IN WOUND CONDITIONS *

JOHN FRASER
Captain, M. C., R. A. M. C.
AND
E. M. COWELL
Captain, R. A. M. C., S. R.
FRANCE

### INTRODUCTION

For a period of over two years we have been reading and recording the blood pressures in a variety of wound conditions. Certain of the observations have been sufficiently interesting to warrant their recordance.

The results may be summarized under various headings:

(*a*) Control blood pressure readings.

(*b*) The blood pressure as observed in wound conditions.

(*c*) Blood pressure readings as studied subsequent to various intravenous infusions.

(*d*) Observations on the blood pressure in the first week of convalescence.

The readings published in this paper have been made at a casualty clearing station, except where otherwise stated.

### A. INSTRUMENTS EMPLOYED AND METHODS OF INVESTIGATION

We have employed several forms of mercury manometers, and of these generally the "Riva-Rocci" instrument. Lately we have been using a spring sphygmomanometer. It would appear that the mercury instruments give the most accurate readings of the systolic pressure, but it is difficult to obtain with them a correspondingly exact reading of the diastolic pressure. The spring instrument, which from a mechanical point of view cannot be as accurate as a mercury column, certainly gives a more easily appreciated reading of the diastolic or minimum pressure. A great advantage of the former is its adaptability and small compass, allowing it to be easily carried in the pocket. With this instrument, many pressure observations on recently wounded men were made in the trenches, and in the advanced dressing stations of field ambulances. In certain cases in which the peripheral pulse can hardly be appreciated, it is necessary to read the pressure by means of the stethoscope. Such readings are very accurate, and a result can be obtained when no pulse can be felt.[1] Readings have been made of the systolic or maximum pressure, of the diastolic or minimum pressure, and of the pulse pressure.

### B. CONTROL BLOOD PRESSURE READINGS

A very large number of control readings were made from healthy soldiers. As was to be expected, a wide range of results was obtained. The readings of the systolic pressure were slightly lower than the records one would have accepted as normal in civil practice. Over a wide series of cases the average systolic or maximum pressure worked out at from 110 to 120, and the diastolic or minimum pressure at from 70 to 80, while the pulse pressure averaged 40 mm. We made what may be considered an interesting observation, that among soldiers engaged in the actual fighting, more especially infantrymen, the average systolic pressure worked out at a higher figure than among men of the same regiment in support, where they were only exposed to occasional fire.

It was noticed that the raised pressure of the fighting man tended to drop quickly when he was resting away from the firing line; for instance, a systolic pressure of 140 mm. dropped to 110 mm., or even to 100 mm.

* Discrepancies between the methods reported in this paper and those reported in later papers are accounted for by the fact that this paper had been completed and presented to the Medical Research Committee before the work which appears in the subsequent papers was begun.

1. Latterly we have used this method to the exclusion of all others.

Observations were made on a series of pilots and observers before and after a two hours' aeroplane bombing raid; the average systolic pressure was 135 mm., and it remained constant on return. In only one case the pressure was raised by 10 mm.

### THE BLOOD PRESSURE AS OBSERVED IN VARIOUS WOUND CONDITIONS

Pressure readings taken in the line on various types of wounds, at very short intervals after the patient had been wounded, show two distinct groups.

1. *The hypertension group*, in which the systolic pressure varies from 150 to 160 or even 170 mm.

2. *The hypotension group* (with primary shock), in which the pressure varies from 40 to 90 mm.

In the number of cases examined at this early period, there were practically none that occupied an intermediate position, that is, showing a normal blood pressure.

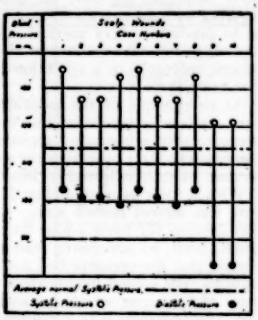


Chart 1.—Blood pressure in scalp wounds.

The pressure of patients in group 1, after resting and the journey to the casualty clearing station, gradually falls, and in the case of a normal recovery with rest in bed the systolic pressure remains at a steady level between 110 and 120 mm.

In Group 2, the patients are cold, often pulseless, and many of them suffer from severe thoracic or abdominal wounds. Occasionally the anatomic lesion appears to be entirely out of proportion to the physiologic reaction; for example, a simple bullet wound of the buttock was accompanied by a systolic blood pressure of 50 mm. at the end of the three hours.

In this group intense primary shock is present, and with the occurrence of hemorrhage, secondary shock develops and the pressure continues to fall.

Following the application of treatment, arrest of hemorrhage and pain, with rest and warmth, the blood pressure may become partially reestablished.

#### A. HEAD WOUNDS

1. *Scalp Wounds.*—These showed a slight elevation in blood pressure readings; all the cases which we had an opportunity of examining varied between 120 and 130 in systolic pressure, with a mean diastolic pressure of 100.

2. *Compound Fracture of Skull with Dura Intact.*—These cases showed a high systolic pressure; with one exception all the cases that we had an opportunity of examining registered a systolic pressure of 140 mm. and over.

The single exception showed a systolic pressure of 100 mm., but such a low reading could be explained by the fact that associated with a very extensive fracture of the bone there was profuse hemorrhage from the meningeal and scalp vessels.

3. *Penetrating Wound of Skull, That Is, Compound Fracture, Dura Torn and Foreign Body Retained.*—On examination of these cases it was found that as a rule a low blood pressure was registered. The systolic pressure varied from 60 mm. to 112 mm. over a series of cases. It was interesting to observe that the diastolic pressure closely corresponded to the systolic pressure with a correspondingly low pulse pressure. We can offer no explanation of this feature, which was relatively constant throughout this type of case. The wounds were such as not to result in increased intracranial pressure.

4. *Perforating Wounds of Skull.*—In types of perforating wounds—that is to say, with entrance and exit wounds—the blood pressure readings could be divided into two groups, one in which the systolic reading was high, varying from 310 to 170 mm., and a second group in which the readings were low, varying from 100 to 110 mm. This subdivision corresponds to a certain anatomic distribution. The first group of high pressure readings consisted of those in which the through-and-through wounds involve the ventricles, and were accompanied by hemorrhage into the cavities of the ventricles.

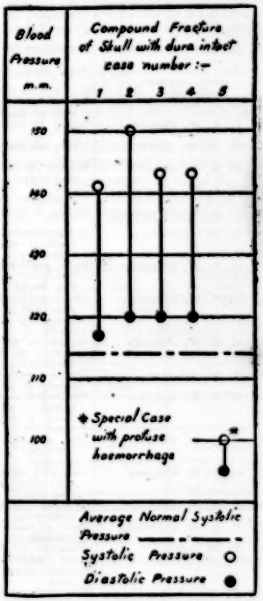


Chart 2.—Blood pressure in compound fracture with dura intact.

In the second group the wounds had involved the brain more or less superficially, and generally occurred in varying axes of the frontal and occipital regions.

Daily readings in patients recovering after operation for the second type of wound show that the systolic pressure is maintained at a constant level of from 110 to 120 mm. as long as convalescence is uncomplicated. The onset of meningitis is accompanied by a rise of blood pressure corresponding to the increase in the intracranial tension.

5. *The Effect of Anesthesia on the Blood Pressure Readings of Head Wounds.*—It was in regard to answering this question that our attention was first directed to blood pressure readings in various wound

2. As the result of further observations made in the front line trenches, the pressures of early wounded are divided into three groups (Cowell, E. M.: Initiation of Wound Shock, THE JOURNAL A. M. A., to be published): (a) Trivial wounds, in which there is no alteration in pressure or tension. (b) Moderately severe and not immediately endangering life, in which there is no primary shock, but in certain circumstances secondary shock develops. (c) Severe wounds, in which unavoidable primary shock is present.

conditions. We had noticed a sequence of events somewhat as follows:

A man is admitted with one of the severe types of head wounds associated with tearing of the meninges and laceration of the brain; no examination is made of the blood pressure; operation is performed within an hour or two following admission. In the later stages of the operation and subsequently, a case, which before operation had appeared promising, now entirely alters, the pulse rate becomes very rapid, unconsciousness deepens, the respiration rate is greatly increased, the patient becomes bathed in the most profuse perspiration, the temperature usually falls to a subnormal level, and death very rapidly supervenes.

TABLE 1.—SUMMARY OF ABDOMINAL CASES

| No. and Clinical Condition | Special Features | Blood Pressure |
|---|---|---|
| 1 Wound of back; extraperitoneal wound of colon | Very slight hemorrhage; peritoneal cavity not opened | 120 sys.<br>90 dias. |
| 2 Wound of small intestine | General peritonitis; large amount of blood | 100 sys.<br>70 dias. |
| 3 Multiple wounds of small intestine | Large amount of free blood | 85 sys.<br>60 dias. |
| 4 Small wound of anterior abdominal wall; two perforations of stomach | Moderate amount of blood in peritoneum | 70 sys.<br>40 dias. |
| 5 Wound apparently perforating abdomen | Operation showed no perforation | 128 sys.<br>100 dias. |
| 6 Wound apparently perforating abdomen | No operation; recovery... | 130 sys.<br>100 dias. |
| 7 Large shell wound of abdomen | Injury to liver, colon and duodenum | 50 sys.<br>? dias. |
| 8 Supposed wound of abdominal cavity | No perforation ..... | 150 sys.<br>100 dias. |
| 9 Four perforations in small intestine | Large amount of blood in peritoneal cavity | 100 sys.<br>80 dias. |
| 10 Perforation of cecum and transverse colon | General peritonitis; small amount of blood | 110 sys.<br>90 dias. |
| 11 G. S. W. apparently perforating abdomen | Operation showed an extraperitoneal wound of rectum | 125 sys.<br>100 dias. |
| 12 G. S. W. abdomen..... | Nonperforating ..... | 140 sys.<br>100 dias. |
| 13 G. S. W. abdomen..... | Nonperforating ..... | 138 sys.<br>100 dias. |
| 14 Two small wounds of small intestine; very stout man | Very slight hemorrhage.. | 140 sys.<br>95 dias. |
| 15 G. S. W. abdomen..... | Injury to liver; abdomen full of blood | 138 sys.<br>100 dias. |
| 16 G. S. W. abdomen..... | Injury to right kidney... | 140 sys.<br>100 dias. |
| 17 G. S. W. abdomen..... | Injury to left kidney.... | 130 sys.<br>98 dias. |
| 18 G. S. W. abdomen..... | Wound of liver; extreme hemorrage | 105 sys.<br>70 dias. |
| 19 G. S. W. abdomen..... | Injury to prostate and bladder | 90 sys.<br>60 dias. |
| 20 G. S. W. abdomen..... | Injury to liver ..... | 130 sys.<br>90 dias. |
| 21 B. W. abdomen..... | Extraperitoneal wound of bladder; slight hemorrhage | 140 sys.<br>100 dias. |
| 22 G. S. W. abdomen..... | Four perforations; small intestine; about 1 pint free blood | 120 sys.<br>95 dias. |
| 23 G. S. W. abdomen..... | Four perforations jejunum and 1 in colon; about 1½ pints of free blood | 120 sys.<br>93 dias. |
| 24 G. S. W. abdomen..... | Injury to pancreas and spleen; about 1½ pints of free blood | 125 sys.<br>90 dias. |
| 25 B. W. abdomen..... | Simple perforation of colon; no free blood | 110 sys.<br>80 dias. |
| 26 G. S. W. abdomen..... | Perforated spleen, bruised kidney and colon; about 1 pint of free blood | 136 sys.<br>105 dias. |
| 27 G. S. W. back..... | Six perforations; small intestine; profuse hemorrhage | 50 sys.<br>20 dias. |
| 28 G. S. W. abdomen..... | Lacerated liver and kidney; about 2 pints of free blood | 110 sys.<br>85 dias. |
| 29 G. S. W. abdomen..... | Bruising stomach; no hemorrhage | 120 sys.<br>90 dias. |
| 30 G. S. W. abdomen..... | Tear of colon and small intestine | 120 sys.<br>90 dias. |
| 31 B. W. pelvis..... | Observed in A.D.S.; exact wound unknown; long carry over the open | 50 sys.<br>30 dias. |
| 32 B. W. pelvis..... | Observed in A.D.S.; probable small intestine lesion | 45 sys.<br>? dias. |
| 33 G. S. W. abdomen..... | Observed in A.D.S.; probable small intestine lesion | 125 sys.<br>80 dias. |

It was difficult to discover any explanation of such a rapid change. The time was too short for sepsis to be the explanation, the amount of hemorrhage was never sufficient to explain the condition, and the injury itself was not one that involved any immediately vital part.[3] We began examining the blood pressures in these cases, and from such an examination we believed we had found the explanation of the disaster.

These are cases with a blood pressure which is either low or unstable. If operation is performed during the early stages of the case, the effect of the anesthetic, together with the extensive opening of the skull, is such as to produce a very marked fall of pressure. The level is so low that no further rise is secured, and the patient succumbs to a condition that clinically resembles acute shock.

As an example of the unstable type of blood pressure, we have seen a case in which the systolic blood pressure before operation registered 164 mm.; taken immediately after operation the pressure had fallen to 16 mm. Death followed within thirty minutes.

With a view to overcoming the danger, our procedure was altered in two ways. If possible, operation was delayed for twenty-four and even for forty-eight hours, until, by successive readings, one had assured oneself that the pressure had acquired some degree of stability; the second modification was that in doubtful cases and in cases which demanded immediate operation, the operation was performed either with a local anesthetic or while the patient was under the influence of scopolamin and morphin. Since these modifications were adopted, disasters such as we have described have not been observed.[4]

6. *Summary of Results of Examination of the Blood Pressure in Head Wounds.*—1. Scalp wounds show no appreciable alteration in blood pressure.

2. Cases of compound fracture of the skull with dura intact show a relatively high blood pressure, averaging above 140 mm.

3. Penetrating wounds of the skull with free drainage are generally associated with a low blood pressure—from 60 to 112 mm.

4. In perforating wounds the blood pressure would appear to vary according to the anatomic distribution of the wound. If the wound has involved the ventricles, the blood pressure is high, varying from 130 to 170 mm.; if the wound is more superficial and has not involved the ventricles, the blood pressure is low, resembling the class in Summary 2.

5. The blood pressure subsequent to wounds of the head is apt to be unstable. If operation is performed under general anesthesia before the blood pressure has become stable, disaster is liable to ensue. The possibility of such an ill result can be diminished by delaying operation until the blood pressure has become stable or by performing the operation under local anesthesia.

### B. ABDOMINAL WOUNDS

Before an analysis is made of the blood pressure in this type of wound, it will be of advantage to include a very brief summary of the cases, their clinical condition and relative blood pressures (Table 1).

3. Observations published in a later number of this series (Cannon, W. B.: Acidosis in Cases of Shock, Hemorrhage and Gas Infection, THE JOURNAL A. M. A., this issue, p. 531) show that this condition was probably related to a developing acidosis.

4. These methods were employed before the rationale of preparing patients for operation as given further on (Cannon, W. B.; Fraser, John, and Cowell, E. M.: The Preventive Treatment of Wound Shock, THE JOURNAL A. M. A., to be published) had been worked out.

From such a study as the table contains, the question arises: Can one with any degree of certainty draw definite conclusions from the blood pressure in supposed wounds of the abdominal cavity? We believe that we can with a minimum of error draw certain deductions.

First there are certain points to be considered. Cases 1 to 20 were observed at a casualty clearing station after a comparatively short journey, that is, within from three to six hours after being wounded. In Cases 21 to 30, with the exception of Case 27, more than ten hours had elapsed between receipt of the wound and admission to the casualty clearing station; in these the primary shock had abated.

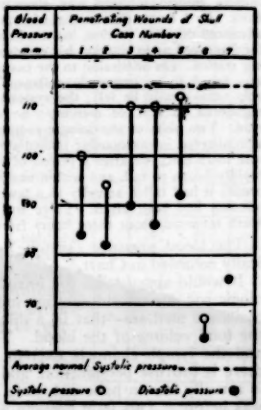


Chart 3.—Blood pressure in penetrating wounds of skull.

Patient 27 was observed within six hours of being wounded. Patients 31, 32 and 33 were seen at an advanced dressing station, Patients 31 and 32 within three hours of being injured, and after a long and difficult carry over dangerous ground, and during a bitterly cold night. Patient 33 was quite fit when seen in the advanced dressing station, but very shortly afterward suffered marked collapse. Such a patient as this has been known to walk a mile after sustaining a penetrating wound of the abdomen, involving injury to the small intestine, and showing during this time a normal blood pressure and pulse. These patients soon become worse, and the collapse is then very intense.

The deductions we have thought it justifiable to draw are briefly as follows:

1. In patients seen on arrival at a casualty clearing station within six hours of being wounded, if there is an intraperitoneal injury of a hollow viscus, the blood pressure is low. In the series of cases of this description which we examined the systolic pressure varied from 50 to 100 mm.

2. When a period of from six to ten hours has elapsed, the pressure will probably have risen, for the primary wound shock is now beginning to pass off—the rest on the stretchers, the warmth and the sedative action of morphin are beginning to have effect.

3. At a period later than ten hours, the pressure begins to fall and a shocklike condition becomes evidenced; the change is due to sepsis and to loss of blood (secondary wound shock).

4. Perforating wounds of solid viscera of moderate severity appear to be associated with a relatively high blood pressure: wounds of the liver and kidney often exhibit a systolic reading of from 130 to 140 mm., and this even in cases in which the hemorrhage is considerable. We have observed a tear of the liver in the case of a soldier run over by a limber, in which the systolic pressure of 140 was maintained for twenty-four hours. At the end of this time the pressure fell suddenly and the patient succumbed.

5. Perforating wounds of the viscera which do not open into the peritoneal cavity are associated with a practically normal blood pressure, as in Case 1, an extraperitoneal wound of the colon, and Case 11, an extraperitoneal wound of the rectum.

6. Large wounds of the parietes are generally associated with a lower blood pressure than small wounds, even though the former may have produced much less visceral destruction than the latter. This is probably explained by the fact that in the former instance peritoneal blood readily escapes, while in the latter the hemorrhage continues to be retained.

We have made several observations regarding the effect on the blood pressure of opening the peritoneal cavity. Briefly, we found that if the abdominal cavity contained a large amount of blood, there was a very rapid fall of pressure as soon as the peritoneal cavity was opened, and the blood allowed to escape. If, on the other hand, the abdominal cavity did not contain much blood, the opening of the abdomen was followed by a temporary rise in blood pressure by as much as 20 mm. After ten minutes the blood pressure fell to slightly below the figure that it registered before operation.

### C. CHEST WOUNDS.

A summary of chest cases is given in Table 2.

From these readings there are a few conclusions that may be drawn:

1. Large open wounds of the chest with free entrance and exit of air are accompanied by a profound fall of blood pressure; this is evidenced in Case 9.

2. Patients with uncomplicated closed wounds of the chest who arrive at the casualty clearing station well cared for show normal pressure.

3. When severe internal hemorrhage has occurred and the patient has been exposed to the cold for some hours, or when infection has become established, hypotension is present and progressive.

4. Patients whose chest wounds are complicated by perforation or laceration of the diaphragm behave in the same way as Class 2 or 3.

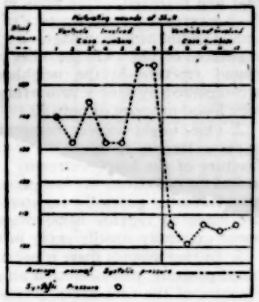


Chart 4.—Blood pressure in perforating wounds of skull.

The high pressure recorded in Case 15, under the influence of rest and morphin, rapidly dropped to 120, and remained so for the remainder of the time the patient was under observation. In Case 16 the pressure gradually dropped with the onset of a septic pericarditis.

### D. MULTIPLE WOUNDS AND WOUNDS OF EXTREMITIES

Out of a large number of observations we have selected a summary, representative of different types of wounds (Table 3).

1. Compound fracture of the lower extremity, seen in the casualty clearing station, was generally associated with a considerable fall in blood pressure, more marked when the fracture affected the region of the knee joint. Undoubtedly the blood pressure reading was largely affected by the amount of hemorrhage

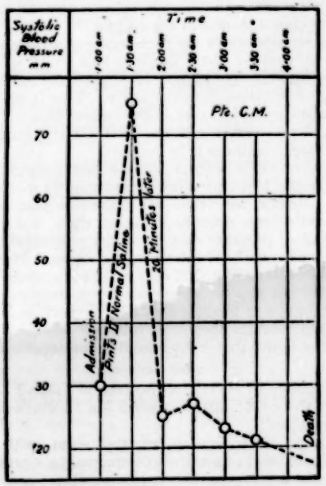


Chart 5.—Systolic blood pressure with administration of 2 pints of physiologic sodium chlorid solution.

that had occurred. One finds in such a case as Case 6—a severe compound fracture of the tibia with a very small amount of hemorrhage—a systolic blood pressure registered of 143. On the other hand, Case 4—a compound fracture in the neighborhood of the knee, accompanied by severe hemorrhage—registered a systolic blood pressure of only 30.

2. One might expect compound fracture of the upper extremity to affect the blood pressure less than fracture of the lower extremity. We were surprised to find the comparatively low pressure which compound arm fractures generally registered; the remarks that are made as regards hemorrhage in wounds of the lower extremity equally apply in this connection.

3. In face wounds there is not much alteration of the blood pressure, unless there is an associated compound fracture of the face bones, when the pressure is generally lowered.

4. Multiple wounds of the body and extremities were accompanied by a considerable fall in blood pressure.

## Blood Pressure Readings as Studied Subsequent to Various Intravenous Transfusions

### A. Physiologic Sodium Chlorid

For many years the intravenous infusion of physiologic sodium chlorid solutions (0.9 per cent. sodium chlorid) has been extensively used in shock and in collapse after hemorrhage. We confess we have been greatly disappointed with the results obtained, and blood pressure readings confirm the clinical disappointments that we have experienced. Chart 5 is typical of many that we have recorded.

Private C. M. was admitted with a simple fracture of the right humerus and a severe shell wound, involving the right knee. The wound was sustained at 9 p. m., and he was admitted to the advanced dressing station by 10 p. m. He was then in a collapsed and pulseless condition. He was treated by the application of warmth, and half a pint of physiologic sodium chlorid solution was given subcutaneously in each flank. By 1 a. m., that is, three hours after admission to the advanced dressing station, his condition was said to have so far improved as to warrant his removal to the casualty clearing station. On admission to the casualty clearing station he was found to be extremely collapsed; a radial pulse could only occasionally be felt; the systolic blood pressure barely registered 30 mm. of mercury; no diastolic pressure was read. Two pints of physiologic sodium chlorid solution were administered intravenously; immediately the systolic pressure rose to 75 mm., but after a period of about twenty minutes it rapidly began to fall, and within one hour after the administration it had fallen actually to a lower level than before the infusion had been given. There was no further rally, and death occurred about three hours later.

The blood pressure (systolic) readings are graphically recorded in Chart 5.

It would appear that the introduction of the physiologic sodium chlorid solution induced a condition of hydremic plethora—that is, a dilution and increase in the total volume of the blood. The kidneys, the skin and the lymph channels excrete the excess of fluid, there is profuse perspiration, and presently the blood is actually less in bulk and more concentrated than it was before. This is in keeping with the observations of Lazarus Barlow, who has shown that the specific gravity of the blood at first falls from 1.064 to 1.054, and later rises to 1.067; in other words, there is at first a dilution of the blood and afterward an actual concentration.

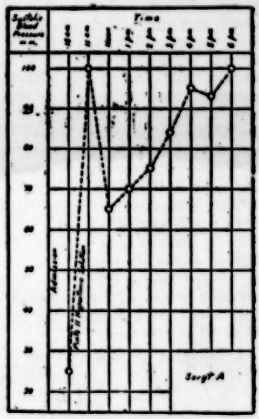


Chart 6.—Systolic blood pressure with administration of 2 pints of hypertonic solution.

### B. Ringer's Solution and Its Modifications

The fluid known as Ringer's solution has the following composition: sodium chlorid, 0.9 per cent.; potassium, 0.03 per cent.; calcium, 0.02 per cent., and a trace of sodium carbonate.

In place of this we have been using a hypertonic solution, as recommended in a publication of the Medical Research Committee, and constituted thus: sodium chlorid, 2 gm.; potassium chlorid, 0.05 gm.; calcium chlorid, 0.05 gm.; water, 100 c.c.

From its intravenous use we have obtained satisfactory results, and the clinical history and blood pressure chart of a typical and successful case is recorded.

Sergeant A., R. F. A., was admitted with a severe shell wound of the pelvis, injury to the bladder and prostate and profuse bleeding. On admission the respective pressures were: systolic, 90 mm.; diastolic, 60 mm. Immediate operation was necessary. Subsequently there was intense collapse—the systolic pressure registered only 25 mm., the diastolic pressure about 20 mm. Two pints of hypertonic solution were administered intravenously, and in immediate response the pressures rose, respectively, to 100 mm. and 80 mm. One hour later they had fallen to 65 mm. and 50 mm. Thereafter the pressure steadily began to rise, and six hours later it had reached 100 mm. and 80 mm.

The readings were maintained, and an eventual recovery was made.

Chart 6 graphically illustrates the blood pressure (systolic) readings in this case.

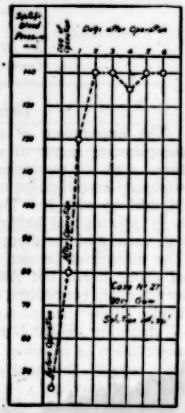

Chart 7.—Systolic blood pressure with administration of an infusion of 30 ounces of gum solution.

### C. COLLOIDAL SOLUTION

At the suggestion of Prof. W. Bayliss and Col. Cuthbert Wallace, A. M. S., we have used intravenously in cases of hypotension due to profound shock and the toxemia of gas gangrene a solution of gum acacia.

We had first arrived at the formula we have used with undermentioned cases, when the report of the Medical Research Committee was published, March 24. The formula we employ is as follows: calcium chlorid (B. P.), 0.075 gm.; sodium chlorid, 1.325 gm.; gum acacia, 2 gm.; water, 100 c.c. A double strength solution is conveniently made and kept in sterilized bottles—sterilization should be repeated each week. This solution is made up as follows: calcium chlorid (B. P.), 13 grains; sodium chlorid, 232 grains; gum acacia, 350 grains; water, 1 pint.

In comparison with the formula recommended by the Medical Research Committee, we give less sodium chlorid and more calcium chlorid, while we omit the potassium salt entirely. With this solution good results have been observed when from 15 to 20 or even 30 ounces of the solution are given intravenously. The solution was given slowly at the rate of 5 ounces in five minutes, and its heat maintained at a temperature of about 120 F. in the reservoir. It passed from the reservoir through a compte-gouttes chamber and entered the body by means of a small glass cannula tied into cephalic or saphenous veins. The infusion was repeated after twelve or twenty-four hours, if necessary.

Chart 7, taken from Case 27, is added to illustrate graphically the blood pressure (systolic) response in a successful case.

From a study of the cases quoted above it may be seen that the pressure almost invariably rises within a few minutes of the infusion being begun. This fact often enables the necessary operative treatment to be carried out, even in the worst type of case which presents itself at a casualty clearing station—such a case, for example, as shows a hypotension pulse with general collapse and associated with shock, hemorrhage and toxemia.

When it has been possible to remove the source of infection, the rise of pressure is progressive in the subsequent twenty-four hours, and the pressure is maintained during the early critical days of convalescence.

In Case 27 the patient was admitted apparently moribund. After an hour's rest with warmth and rectal glucose-saline injection, he was submitted to laparotomy; there were about 2 pints of free blood in the peritoneal cavity, and six perforations of the intestine required suture. Intravenous infusion of gum was commenced with the operation. When the operation was completed, thirty minutes later, the pressure had risen to 80 mm., and a fair pulse was palpable at the wrist. The following day the pressure was 120 mm.; it rose later to 140 mm., and remained at this figure during an uneventful convalescence.

### D. DIRECT BLOOD TRANSFUSION

We have had an opportunity of observing in several cases the results of direct blood transfusion. The transfusion was necessary on account of severe arterial hemorrhage, and was carried out by the direct method, as suggested by Basset and Fullerton. The time of the transfusion varied from fifteen to twenty-two minutes. It is difficult to estimate with any degree of exactness how much blood was transferred during these respective periods, but we calculate roughly that from 500 to 700 c.c. would be about the proper estimate.

The following are the notes and the blood pressure chart of one of these cases:

Lieutenant ——, admitted with a severe shell wound of the left thigh: the femoral vessels were torn; no tourniquet had been applied, and the patient was practically moribund from loss of blood.

After the local wound had been dealt with a donor was secured, and direct transfusion of blood begun. Transfusion was continued for fifteen minutes. Clinically there was a most dramatic improvement, and within the course of a few hours the pulse rate had fallen from 150 to 95. The systolic blood pressure on admission was very difficult to estimate; but it was estimated at about 20 mm. Before the transfusion had been completed it rose to 115; one hour later it had fallen to 100. At the end of another hour it had risen to 110, and about this level it remained for the first twenty-four hours; thereafter it attained and remained at a level of about 120.

The blood pressure readings were as shown on charts.

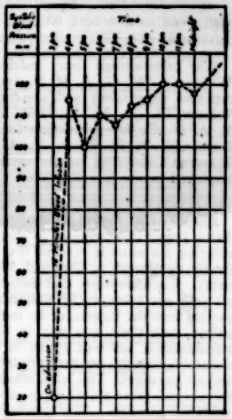

Chart 8.—Systolic blood pressure with fifteen minutes of direct blood transfusion.

### E. GLUCOSE SOLUTION

We have no records of blood pressure readings following the infusion of hypertonic glucose solutions.

### F. OTHER MEASURES

From time to time various drugs are advocated, such as pituitary solution, epinephrin, caffein, camphor, etc. At present there is not sufficient evidence to show that one of these drugs takes precedence over the others.

### G. CONCLUSIONS

1. In cases of profound shock accompanied by loss of blood, excellent results are obtained from direct blood transfusion.

2. Injection of the calcium hypertonic gum solution will produce an immediate rise of pressure in hemorrhage cases or cases of hypotension, complicated by toxemia.

This rise may tide the patient through an operation. If the source of the infection is removed, the tension will remain supported.

3. In milder cases of shock and hemorrhage, infusion with hypertonic saline is useful.

4. Results obtained after infusion with physiologic sodium chlorid solution have been unsatisfactory.

### Pressure Observations in the First Week of Convalescence as an Aid to Prognosis and to Treatment

An extensive number of pressure charts have been collected, showing the behavior of the tension not only before and during operation, but also in the first week of convalescence. We have thus a series of controls that show such complications as the onset of sepsis or gas gangrene, and illustrate the subsequent history of intravenous infusion for shock, hemorrhage and toxemia.

An uncomplicated wound running a favorable course shows a steadily maintained blood pressure. With the onset of gas gangrene or sepsis there is a sudden fall in pressure (Case 13). Occasionally a long sustained hypotension pressure reading may be observed (Cases 9 and 12), even though the patient is quite well and no sepsis is present.

A steadily rising or maintained high pressure reading, even in a severe wound, may be taken as a most favorable prognostic sign (Cases 2 and 6).

We acknowledge our indebtedness to Col. Cuthbert Wallace, C. M. G., A. M. S., and to Professor Bayliss, for repeated suggestions and assistance; to Lieutenant-Colonel Winder, R. A. M. C., and Lieut.-Col. A. H. Safford, R. A. M. C., for permission to investigate the subject; to Lieut.-Col. T. R. Elliot, R. A. M. C., and the Medical Research Committee for the various instruments which were employed in the investigation.

**Dust in the Lungs.**—Lehman, working with white lead dusts, found that from 35 to 43 per cent. by weight of that entering the nostrils reached the lungs, the rest either being finally swallowed or breathed, blown or sneezed out of the nares. Insoluble dusts that do reach the finer bronchioles or air cells are taken up by wandering cells or phagocytes and carried into the tissues, or by means of their sharp edges or points work their own way in and there give rise to local inflammation, followed by an increase of fibrous connective tissue, especially marked around the small blood vessels and air passages. This firm, nonelastic fibrous tissue replaces the normal, more elastic tissue and crowds and contracts the small air passages. The former prevents the normal expansion and contraction of the lungs with respiration and the latter causes dilatation of the terminal air cells due to increased resistance to expiration and hinders the normal flow of blood in the lungs, so lessening the amount of oxygen taken up by the blood and the amount of carbon dioxid given off. This slows up normal tissue metabolism and lowers the general body tone, lessening resistance to disease, especially to infections of the respiratory tract. Such fibrosed lungs yield more readily to attacks of infective bronchitis and pneumonia, and many claim also they make excellent soil for the development of tuberculosis.—Henry Field Smyth, M.D., Dr.P.H., in *Scientific Monthly*.

## SOME ALTERATIONS IN DISTRIBUTION AND CHARACTER OF BLOOD IN SHOCK AND HEMORRHAGE

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### Introduction

The importance of traumatic shock as a serious complicating factor of wounds and of surgical operations, and its mysterious nature, have combined to stimulate investigation into its causes and into methods of dealing with it. That investigation of shock has been difficult and baffling is indicated by the number and variety of the theories put forth to account for it. The difficulties lie not only in the obscure character of shock itself, but also in complications introduced by attendant conditions, such as hemorrhage and sepsis. Under these circumstances the most hopeful mode of obtaining insight is by gathering as many facts of observation as possible, with the chance that the facts may suggest the nature of the process or processes that are occurring.

The observations of Sherrington and Copeman[1] that intraperitoneal operations on animals raise the specific gravity of the blood, the confirmatory studies of Cobbett[2] and also of Vale,[3] indicating a concentration of the blood in conditions that induce shock, and the experiments of Mann,[4] showing that the amount of blood stagnant in the tissues of an animal in shock may be more than 50 per cent. above the amount in the normal animal—all these evidences indicate that examination of the blood might yield significant facts. Warfare provides shock cases in large numbers. At a casualty clearing station, where only the most severely wounded were admitted for treatment, we have had an unusually favorable opportunity to study their conditions, and at Col. Cuthbert Wallace's suggestion we undertook observations on the physical features of the blood in these cases. The present account is based on records of observation in ninety-eight cases of shock and hemorrhage, and in fourteen control cases.

The routine examination consisted of a count of the red blood corpuscles (referred to henceforth as "red count"), estimation of the hemoglobin by use of the Haldane hemoglobinometer, and determination of the percentage of corpuscles in the blood, either by capillary hematocrit or by larger graduated tubes, if the amount of blood permitted. When desirable to keep the blood for some time unclotted, potassium oxalate crystals were added in minimal amount; but when this was done, the hematocrit readings were made at once in order to avoid any change of corpuscle volume through the action of the added salt.

Although the blood examinations were made in a routine manner, we have kept in mind certain ques-

1. Sherrington and Copeman: Jour. Physiol., 1893, **14**, 83.
2. Cobbett: Shock, in Allbutt: System of Medicine, London, 1897, **3**.
3. Vale: Med. Rec., New York, 1904, **66**, 325.
4. Mann: Surg., Gynec. and Obst., 1915, **65**, 380.

tions to which we hoped to find more or less definite answers:

1. Are these changes in certain physical features of the blood peculiar to cases of shock and of hemorrhage?

2. Are there typical postoperative blood changes in these cases?

3. What are the effects on the blood of intravenous infusions?

4. May the data provided by blood examinations be helpful in prognosis?

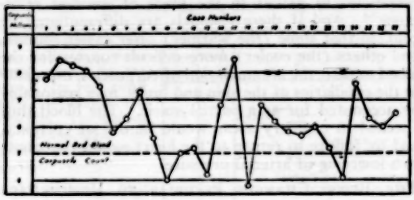


Chart 1.—Red corpuscle counts in twenty-seven cases of severe shock.

We propose to present and consider our results under these headings.

### The Blood Changes Peculiar to Shock

In discussing the blood changes in shock it will be desirable to distinguish between cases of severe or extreme shock, as seen at the casualty clearing station, and those of moderate character. To some extent the judgment of these conditions is based on an extensive clinical experience of one of us (J. F.) in connection with blood pressure determinations in shock cases.[5] Combined with this clinical judgment were pressure readings. Roughly, the moderate cases had a systolic pressure over 90 mm. of mercury, and the severe cases not over 70 mm.

The first noteworthy characteristic of the blood in shock is a high capillary red count. In Chart 1 is presented the red count in twenty-seven cases classified as severe traumatic shock. In all but eleven of the cases the count was 6 million corpuscles or higher, and in eight cases it was more than 7 million corpuscles.[6] When hemorrhage as a complicating factor tending to reduce the blood count is considered, these high counts are striking. They indicate that in shock a concentration of the blood occurs, at least in the superficial capillaries.

Whether or not the concentration found in capillary blood is true of all the blood can be determined by counting capillary and venous samples taken at the same time. When this is done, a more or less marked discrepancy between the two is revealed. The capillary samples have been taken from widely separated parts of the body—from the lobe of an ear, from a finger or from a toe; the venous samples from an arm vein. In Chart 2 are plotted the observations in seven cases of severe shock, four cases of moderate shock, and five cases in which no shock was present. The strikingly higher capillary than venous red count in the severe cases, amounting frequently to 2 million corpuscles, was reduced in the moderate cases, but even in these the difference is still nearly a million corpuscles per cubic millimeter.[7] In the final group of cases, in which no shock was present, the capillary count was uniformly slightly higher than the venous, but as compared with the results in the other two groups, the difference is neglible. These observations have been made independently by two observers. Bürker[8] states that in the same person blood from the finger tip and ear is the same with reference to hemoglobin content and red counts within an error of 1 per cent., and that blood from an elbow vein, when flowing free, is indistinguishable from that of the ear or finger. Control observations made by us on normal individuals did not reveal greater differences than 3 per cent. between capillary and venous counts; and comparative counts of capillary and venous blood taken before rising from bed in the morning proved that the discrepancy is not due merely to inactivity. From the foregoing considerations it is clear that the difference between capillary and venous red counts varies roughly with the degree of shock, and, since the venous count is approximately normal, the difference is due to concentration of the blood or stagnation of corpuscles in the capillaries.

In all probability the low temperature typical of patients in shock is an important factor in producing the increased corpuscular content of the capillaries. It is known that blood drawn from a cold finger contains a larger number of corpuscles in a given volume than that drawn from the same finger after it has been warmed.[9] In cases of shock, simultaneous counts of venous blood and samples from capillaries of the ear, the finger, and the mucous membrane of the mouth show significant differences. In one case of slight shock the venous red count was 5,360,000, the ear and finger capillary counts 6,450,000 and 6,280,000, respectively, and the buccal count 5,600,000. The capillaries of the mouth, less exposed to loss of heat than those of the skin, contained blood nearer the venous blood in concentration than did those of the skin, but still indicating stasis.

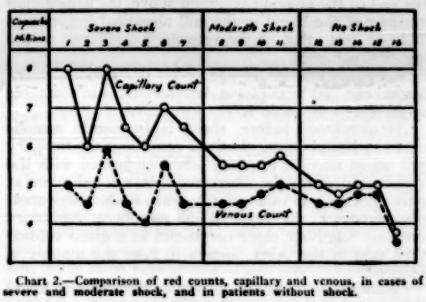


Chart 2.—Comparison of red counts, capillary and venous, in cases of severe and moderate shock, and in patients without shock.

When the capillary stagnation has become established, it does not promptly disappear. We have seen

5. Fraser, John, and Cowell, E. M.: Clinical Study of Blood Pressure in Wound Conditions, THE JOURNAL A. M. A., this issue, p. 520.

6. These counts were made by means of a Thoma instrument made by Hawksley; it was compared with a Thoma-Zeiss instrument, and a difference of only 10,000 corpuscles in 5,000,000 was found.

7. Capt. E. Emerys-Roberts has reported to us verbally that he has made similar observations in cases of shock, and recently the results have been confirmed by Capt. Eric Taylor.

8. Bürker: Tigerstedt's Handbuch der Physiologischen Methodik, Leipsig, 1912, **2**, Part 5, p. 4.

9. Gulland and Goodall: The Blood, London, 1914, p. 61.

a patient who had recovered from severe shock, but whose hands from wrist to finger tips, in spite of being warmed, were still bluish-gray with stagnant blood.

Hematocrit determinations of the volume per cent. of corpuscles in capillary and venous blood have also been made. In each instance duplicate tests were carried out in order to avoid any error that might arise from adhesion of blood to the wall of the capillary tube. The results confirmed the discrepancy between capillary and venous samples that was found in the counts. The capillary corpuscle volume was greater than the venous by amounts ranging from 12 to 33 per cent.

TABLE 1.—VENOUS AND CAPILLARY RED COUNTS, WITH HEMATOCRIT AND HEMOGLOBIN READINGS, IN SOME CASES OF LOW BLOOD PRESSURE

| Initials* | Blood Pressure | | Red Counts (in millions) | | Hematocrit | | Hemoglobin | |
|---|---|---|---|---|---|---|---|---|
| | Diastolic | Systolic | Venous | Capillary | Venous | Capillary | Venous | Capillary |
| P. K. | 24 | 52 | 2.8 | 5.6 | — | — | — | — |
| A. S. | 38 | 62 | 4.5 | 6.4 | 30 | 41 | — | — |
| E. G. | 40 | 64 | 6.2 | 8.5 | 30 | 47 | 88 | 113 |
| F. H. | (near | death) | 4.0 | 6.6 | 31 | 43 | — | — |
| D. H. | 48 | 64 | 4.2 | 5.5 | 37 | 41 | 80 | 95 |
| S. D. | 48 | 72 | 4.7 | 5.3 | 30 | 35 | 75 | 84 |
| W. W. T. | † | 50 | 5.3 | 6.4 | — | — | 92 | 98 |
| W. C. | 58 | 76 | 4.5 | 5.5 | — | — | — | — |
| S. F. S. | 58 | 80 | 4.9 | 5.3 | — | — | — | — |
| T. R. | 70 | 92 | 5.2 | 5.6 | 39 | 44 | 107 | 111 |
| J. H. C. | 80 | 102 | 5.8 | 6.9 | 41 | 45 | 95 | 105 |

* Further information about some of these patients may be obtained by finding these initials in Table 1, Cannon, W. B.: Acidosis in Cases of Shock, Hemorrhage and Gas Infection.
† Irregular.

The difference between capillary and venous blood in shock was further confirmed by hemoglobin determinations. In cases thus compared, the capillary hemoglobin readings exceeded the venous by amounts ranging from 6 to 29 per cent. In the case cited at the end of the second paragraph above, the hemoglobin reading of the blood in the still abnormal fingers was 114 per cent., that of the recovered capillaries of the ear, 104 per cent.

A comparison of some of the blood counts and hematocrit and hemoglobin determinations in our cases is presented in Table 1.

As mentioned before, shock is frequently complicated by hemorrhage. In these conditions the capillary red count may be low, but when compared with the venous red count the discrepancy between the two at once appears. In other words, when hemorrhage complicates shock, the blood in the peripheral capillaries contains relatively more corpuscles in a given volume than that in the veins, though in both the number is reduced.

Observations from day to day on the capillary blood in cases of shock have shown that there is gradually a drop to normal or below in the count and in the hemoglobin and hematocrit readings. In some instances this return to normal has occurred on the second day; in others it may not have been completed for three or four days. A fairly typical case of the slower recovery is the following:

CASE 69 A.—Private L. was admitted suffering from wounds of the face and arm, with fracture of skull; early gas infection, severe; moderate shock.

The red count on admission was 7,510,000; the next day it was still high (7,560,000); on the third day it fell slightly to 7,280,000, and on the fourth day it was 5,610,000. Counts made on five days during the following week disclosed no further important change. The hemoglobin and hematocrit readings likewise fell during the first three days, though not so sharply as the red count. The record is presented in Chart 3.

The influence of cold in producing stagnation or concentration of blood in the capillaries has been mentioned. It is in the capillary region that the corpuscles are most exposed to contact with the vascular wall, that is, in this region and in the finer arterioles friction is greatest, and the energy stored in the arterial pressure is mostly used up. When arterial pressure is low, as in shock, there is naturally a tendency of the blood corpuscles to gather in the place of greatest resistance.[10] And if these channels are differentiated by cold, so that some (the warmer) offer easier courses, and others (the cooler) more difficult courses for the blood to take, the accumulation of corpuscles, especially in the capillaries of the skin and limbs, may reasonably be accounted for as a partial stasis. The blood thus checked in capillary areas would be out of currency, and by failure to return to the heart would contribute to a lowering of arterial pressure.

## THE BLOOD CHANGES PECULIAR TO HEMORRHAGE

Many wounded men have lost much blood; they are not suffering from infection, and they appear to have only such elements of the shock complex as the hemorrhage itself may induce. The question arises as to whether under these circumstances examination of the blood discloses any features that will differentiate hemorrhage from shock.

Blood counts of hemorrhage cases show several distinctive features. The capillary red count is usually much lower than that of shock alone, but is by no means as low as the pallid appearance of the patient might lead one to suspect. In twenty-one cases classified chiefly as hemorrhage, the average capillary count at the time of admission or shortly thereafter was about 5,000,000 corpuscles, with variations ranging from 5,800,000 to 3,900,000. In a few of these cases in which the venous blood was also counted, it proved considerably lower than the capillary count. This is what might be expected, for in severe hemorrhage the blood pressure is reduced, and the cooling of the body induces stasis, just as in shock.

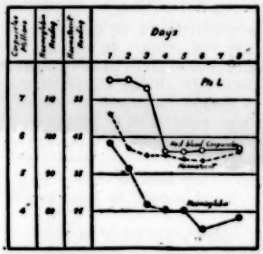


Chart 3 (Private L.).—Count of red corpuscles, with hematocrit and hemoglobin readings.

Another feature of hemorrhage that seems fairly characteristic is a relatively low hemoglobin reading. In the twenty-one cases of hemorrhage, the hemoglobin percentage was 72. If a count of 5,000,000 corpuscles is taken as normal, the color index would be only 0.72, and even with 6,000,000 taken as normal, the index is only 0.9. In shock cases the index is aproximately 1, with 6,000,000 corpuscles regarded as the normal number.

The primary reduction in the count and in the hemoglobin percentage in cases of hemorrhage is followed

10. Cohnstein and Zuntz: Arch. f. d. ges. Physiol., 1888, 42, 326.

by a further fall. The following instance is illustrative:

Private G. was admitted with severe wounds of the left leg. Both tibial vessels were severed, and there had been profuse bleeding. There was marked pallor of all cutaneous and mucous surfaces. The blood examinations on admission and on successive days disclosed a fall, and later the beginning of recovery. On admission the red count was 5,100,000, the hemoglobin 68 per cent. For the next three days both figures fell; on the third day the red count was 3,070,000, the hemoglobin 39 per cent. This tendency continued, but at a slower rate, until the sixth day, when the count was 1,900,000 and the hemoglobin 35 per cent. From this point a betterment began, and on the eighth day the count was 2,550,000, the hemoglobin 38 per cent. On the fifth day there were present in the blood film very small cells resembling microcytes. Throughout the examination no poikilocytosis was observed.

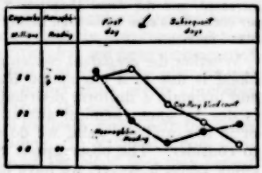

Chart 4.—Red count and hemoglobin percentage in a case of hemorrhage.

We have had several opportunities of confirming, on men who have served as donors in the transfusion of blood, the changes seen in the foregoing case. In these conditions there could be no question of shock or sepsis. The initial red count of the case illustrated in Chart 4 was 5,600,000, the hemoglobin 102 per cent. Transfusion was performed by the direct method, and it was estimated that about 700 c.c. of blood passed from the donor. Some hours later the capillary count was still high, 5,700,000, but the hemoglobin reading had fallen to 88 per cent. The changes during the next few days are shown in the chart. The typical posthemorrhagic fall occurred, but the hemoglobin was relatively lower than the count. In shock cases with hemorrhage as a noteworthy feature, there is usually a relatively low hemoglobin content of the blood.

We may infer from the foregoing evidence that a low hemoglobin reading is highly suggestive of a hemorrhage's having occurred.

## Postoperative Blood Changes

Tracing the course of blood changes in shock cases has led to numerous observations being made both before and after operation. In all these cases the operation was performed with warmed ether as the anesthetic. The results of the observations may be thus summarized:

(*a*) When an operation is associated with considerable bleeding, both hemoglobin and red count are reduced; but, as in the hemorrhage cases, the hemoglobin falls relatively more than the count. This observation has been confirmed in numerous instances. The following case is illustrative:

Case 18 A.—The patient had a severe compound fracture of femur. Before admission the hemorrhage had been slight; the red count was 5,600,000, hemoglobin 90 per cent. The necessary operation was accompanied by much bleeding, and the count then was 4,600,000, the hemoglobin 50 per cent. The fall in the hemoglobin percentage in this case was excessive; as a rule it amounted to about 10 per cent.

(*b*) When the operative hemorrhage is slight, the count and hemoglobin reading after operation are commonly higher than before, and the longer the operation the greater the changes are likely to be. Subjoined is an illustrative case:

Case 14 A.—A patient was admitted with a wound of the abdomen through which a portion of the small intestine protruded; the intestine itself was damaged. Hemorrhage had been slight. The red count before operation was 6,400,000, hemoglobin 112 per cent. The operation was completed with a minimum of bleeding; about 1 foot of small intestine was resected. The operation lasted forty-five minutes, and at the end the red count was 8,000,000, the hemoglobin 130 per cent.

Perspiration is commonly a prominent feature of these cases during the course of the operation—a condition which suggests that the concentration of the blood that we have noted is at least in part due to loss of fluid from the body. That it is not due solely to a stasis of blood in peripheral capillaries is shown by observation of venous blood before and after operation. In one instance, in which there was profuse sweating during the operative procedure, the venous hematocrit determinations showed a rise of corpuscle volume from 32 to 40 per cent. in forty-two minutes.

A puzzling feature that may be mentioned here is the change observed in the circulating blood when a considerable quantity of blood, previously shed, but retained in one of the body cavities, is removed. The removal is followed by a marked drop in the hemoglobin percentage and in the red count. An explanation of the phenomenon is lacking; it has been repeatedly observed.

Case 41 A.—The patient had sustained a penetrating wound of the chest, with much hemorrhage into the left pleural cavity. On the day of admission the red count was 8,000,000, hemoglobin 80 per cent.; the next day the count was again 8,000,000, hemoglobin 78 per cent. On the following day 2 pints of fluid blood were aspirated from the chest. Within eighteen hours thereafter the red count had fallen to 5,000,000, and the hemoglobin percentage to 52. Twenty-four hours later the count was 4,500,000, hemoglobin 56 per cent.

In some cases operation seems to induce a fragmentation of the red corpuscles.

## Blood Changes Observed After Various Injections

As means of treating hemorrhage and shock, transfusion of blood and injections of solutions of salt and of gum have been widely employed. We have made observations on the blood before and after such treatment has been tried.

### A. Blood Transfusion

From 500 to 700 c.c. of blood have been transfused from donor to recipient, either directly, artery to vein, or by means of the Kimpton tube. No diluting or chemical substance has been added to the blood. Naturally transfusion is done when the blood count is low, and, as is to be expected, a great improvement occurs in the recipient's condition. The following case illustrates the degree of improvement that may take place:

Case 100 A.—The patient had received severe multiple wounds; one leg had been blown off. The red count before transfusion was 1,900,000, hemoglobin 31 per cent. It was estimated that about 600 c.c. of blood were transfused directly from a donor. Twelve hours later the red count was 3,000,000, hemoglobin 56 per cent. Twenty-four hours later the count was 2,500,000, hemoglobin 60 per cent. Thenceforth there was steady improvement.

### B. Injection of Gum Solution

A 7 per cent. solution of gum acacia in physiologic sodium chlorid solution has been advocated by Bayliss[11]

11. Bayliss: Proc. Roy. Soc., 1916, **B89**, 380.

to raise blood pressure in shock and after hemorrhage. We had occasion to note the effect of the injection of this solution on the blood count:

Case 64 A.—The patient had sustained a severe abdominal wound, with profound collapse. A pint of 6 per cent. solution of gum acacia was injected intravenously. Before the injection the red count was 4,500,000, hemoglobin 84 per cent. Three hours after the injection the count was 3,800,000, and the hemoglobin 78 per cent.

The persistence of the dilution of the blood in this case is noteworthy.

### C. HYPERTONIC SALINE INJECTIONS

The hypertonic solution was made according to the formula: sodium chlorid, 2.0; potassium chlorid, 0.05; calcium chlorid, 0.05, and water 100. Injection of this fluid produces effects that are illustrated in the cases given.

Case 65 A.—The patient had sustained a compound fracture of femur; the limb was almost severed; there was considerable hemorrhage. In the first blood examination the capillary count was 5,290,000, hemoglobin 84 per cent.; the venous count 4,700,000, hemoglobin 75 per cent. Immediately after operation a pint of hypertonic salt solution was injected intravenously. Five hours later the capillary count was 4,600,000, hemoglobin 70 per cent.

Case 60 A.—The patient had a compound fracture of tibia and fibula, with considerable bleeding. There was early gas infection. The patient's appearance was pallid. Shortly after admission the capillary red count was 6,330,000, hemoglobin 102 per cent.; the venous count was 4,200,000, hemoglobin 94 per cent. After operation 2 pints of hypertonic salt solution were injected intravenously. Six hours later the capillary count was 4,120,000, hemoglobin 55 per cent.

It is noteworthy in these cases that the capillary red counts, some hours after the injection, were much lower than the original capillary counts, but corresponded fairly closely with the original venous counts. This change may be interpreted as a disappearance of the capillary concentration, probably due in part, at least, to improvement in the circulation. The striking feature, however, is the greatly lowered hemoglobin reading when the larger amount of the hypertonic solution was injected. Why this change occurs is difficult to explain. It is a serious disturbance in an important element of the blood, however, and suggests that care should be exercised to avoid introducing unnecessarily large amounts of hypertonic solutions.

## The Value of Blood Examinations for Prognosis

Only repeated examinations of the blood are of prognostic value; conclusions cannot be drawn from a single observation. After this conditional statement we would call attention to the two following points:

### A. THE SIGNIFICANCE OF CONTINUED CONCENTRATION OF PERIPHERAL BLOOD

The concentration of capillary blood, which occurs in shock, if persistent, appears to indicate an unfavorable prognosis, and an increasing concentration is a significant precursor of a fatal outcome. The interrelation between the clinical condition and the persistence of capillary concentration is illustrated in the following cases:

Case 78 A.—The patient was admitted with a bullet wound of the abdomen. Operation disclosed two perforations of the ascending colon. On admission the capillary red count was 8,300,000, hemoglobin 96 per cent. The blood was examined on each of the following four days:

July 13, red count 7,800,000; hemoglobin 104 per cent.
July 14, red count 6,600,000; hemoglobin 98 per cent.
July 15, red count 7,400,000; hemoglobin 98 per cent.
July 16, red count 7,100,000; hemoglobin 99 per cent.

During this period the clinical condition of the patient was precarious; there was restlessness, persistent thirst, and low blood pressure, with rapid pulse.

On the fifth day the capillary blood count suddenly fell to 5,200,000, hemoglobin 82 per cent.; and on the next day still farther, to 3,700,000, hemoglobin 68 per cent. This change synchronized with a striking improvement in the general clinical condition, and an uninterrupted recovery followed.

Case 14 A.—The patient was admitted with a gunshot wound of the abdomen, and perforation of the small intestine. The capillary red count was 6,489,000, hemoglobin 112 per cent. At the end of twenty-four hours the concentration had increased, and the count then was 8,700,000, hemoglobin 130 per cent. This case terminated fatally within the next twenty-four hours.

Whether the *persistent* concentration of the capillary blood is due to a circulation inadequate to establish and maintain a uniform distribution of corpuscles, or is due to some chemical alteration in the corpuscles or in the capillary walls, we do not wish at this time to consider. The observations recorded in the foregoing cases, however, we have had repeated opportunities to verify.

### B. THE SIGNIFICANCE OF PROGRESSIVE DILUTION OF THE BLOOD

As previously pointed out, the intial concentration of the capillary blood normally passes away after a few days. The blood count falls as if the peripheral blood were being diluted or the stagnant corpuscles being swept away. In association with loss of blood, dilution occurs from increase of plasma, but this process also is short lived. A dilution of the blood which continues to progress beyond the fourth or fifth day after injury is ominous, and the longer the dilution continues the more unfavorable it becomes. In the absence of repeated hemorrhage, progressive dilution signifies the presence of sepsis, and generally the involvement of the blood stream (septicemia). The following case is illustrative:

Case 4 A.—The patient was admitted with a severe wound of the buttock and high compound fracture of the femur. The daily blood examinations are recorded in Table 2.

TABLE 2.—DAILY EXAMINATIONS IN PROGRESSIVE DILUTION OF BLOOD

| Day | Capillary Red Count | Hemoglobin, per Cent. | Day | Capillary Red Count | Hemoglobin, per Cent. |
|---|---|---|---|---|---|
| 1 | 5,600,000 | 85 | 5 | 2,500,000 | 54 |
| 2 | 4,500 000 | 66 | 6 | 2,300,000 | 56 |
| 3 | 4,500,000 | 62 | 7 | 2,200,000 | 54 |
| 4 | 3,900,000 | 61 | 8 | 2,000,000 | 50 |

The local wounds were irrigated with flavine, and were doing so well that it was difficult to account for the progressive deterioration of the blood. On the eighth day the patient left our care, but we learned afterward that the deterioration continued, and eventually the patient succumbed to a septicemia.

We have recorded the foregoing case as a single instance of the progressive dilution of the blood, obscure in origin, and followed by septicemia, but we have made several confirmatory observations.

## Summary

In cases of shock as seen at a casualty clearing station in conditions of warfare, the red count of blood,

taken from various capillaries, is higher than that of blood taken from a vein. The discrepancy is greater the more profound the shock, and not infrequently is as much as 2,000,000 corpuscles per cubic millimeter. Since the venous count is approximately normal, the condition is due to a stagnation of corpuscles in the capillaries. The observations by means of blood counting have been confirmed by hematocrit and hemoglobin determinations.

This condition once established in shock is only gradually recovered from; the recovery sometimes requires two or three days.

After hemorrhage, and in cases of shock complicated with hemorrhage, the hemoglobin reading is relatively low compared with the red count.

After operation attended by hemorrhage, the hemoglobin reading is again relatively low compared with the count. If the operation has not been accompanied by hemorrhage, the count and the hemoglobin content of the blood may be higher than before, probably owing to loss of fluid from the body.

Transfusion of blood naturally raises both the count and the hemoglobin reading. Injection of a gum solution leads to a dilution of the blood that may persist for some hours. Intravenous administration of a large amount (2 pints) of hypertonic salt solution may markedly reduce the hemoglobin content of the blood; a smaller amount (1 pint) in our experience has not had this effect. Injection of the salt solution reduces the capillary stasis.

Continued concentration of the capillary blood for several days after injury accompanies a continued unfavorable clinical condition. Disappearance of the concentration is a signal of improvement. Continued dilution of the blood, after the fourth or fifth day, is ominous.

## ACIDOSIS IN CASES OF SHOCK, HEMORRHAGE AND GAS INFECTION

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### Introduction

In the attempt to obtain more facts concerning the conditions that prevail in cases of persistent low blood pressure, it seemed desirable to examine the blood for certain chemical alterations. Among these were changes in the alkali reserve and in the sugar content. A reduction of the alkali reserve would be indicated specifically by less than the normal amount of sodium bicarbonate in the blood. This is the condition of "acidosis" in the sense defined by L. J. Henderson[1] and by Van Slyke and Cullen.[2] The sugar content might be significant as to the nature of the acidosis, and would also throw light on other processes in the body.

The circumstances under which these studies have been conducted required the use of simple apparatus. Fortunately, the instrument invented by Van Slyke,[3] by which the capacity of the blood plasma to take up carbon dioxid can be determined rapidly and accurately permits observations on this feature of the blood to be made even where few laboratory conveniences are available. The results given by this instrument are expressed in volumes per cent. of carbon dioxid, which the plasma holds after being exposed to an atmosphere containing 5.5 per cent. of the gas (the concentration existing in the alveoli, and present in the final air of an extreme expiration.) Any figures lower than 50 per cent. in adults indicate acidosis. In drawing the blood, a syringe was used. In most cases no difficulty was found in thrusting the needle into an elbow vein made prominent by drawing a rubber tube around the upper arm. Care was exercised not to exert such pressure when the tube was fastened as to shut off the arterial flow. As the blood entered the syringe, the piston was gently withdrawn. When sufficient blood had been taken (about 10 c.c.), the tube was loosened and the needle then withdrawn. The blood was transferred to a flask containing a few crystals of neutral potassium oxalate. Agitation of the sample was avoided. The plasma was promptly separated in a centrifuge. All utensils used were carefully washed with water, alcohol and ether. In making the determinations a check was invariably obtained, and in most cases a further exposure of the plasma to the alveolar air was made before the second reading. All the results presented have the values gained by these precautions.

The methods employed in estimating blood sugar was the easy and reliable one devised by Myers and Bailey.[4]

That the impaired circulation in cases of shock would probably lead to a condition of acidosis was pointed out by Yandell Henderson[5] in 1910. Later Crile[6] and his co-workers reported results which indicated that acidosis is present in various clinical conditions, including shock. Recently Henderson has revised his well known acapnia theory of shock,[7] and now interprets the low carbon dioxid content of the blood as probably not a primary acapnia, but as a consequence of acidosis.

The present study includes an examination of forty-seven cases of low blood pressure, whether due to shock alone or complicated by hemorrhage and gas bacillus infection (Table 1). Observations have been made on the relation of acidosis to blood pressure, pulse and respiration; the sugar content of the blood; the effects of anesthesia and operation on existent acidosis and low blood pressure, and the influence of alkaline treatment in cases of extreme acidosis.

### The Relation of Acidosis to Blood Pressure, Pulse and Respiration

#### A. Relation to Blood Pressure

In forty-seven different coincident determinations of blood pressure and carbon dioxid capacity, a rough relation between the two was found. In general the lower the blood pressure the lower the alkaline reserve, that is, the greater the acidosis. This relation is illustrated in Table 2.

It is noteworthy that in forty of the forty-seven cases the mean blood pressure was below 60 mm. of mercury, and that in all these there was a carbon dioxid capacity less than 50 volumes per cent.—a condition of acidosis was present. Furthermore, as the

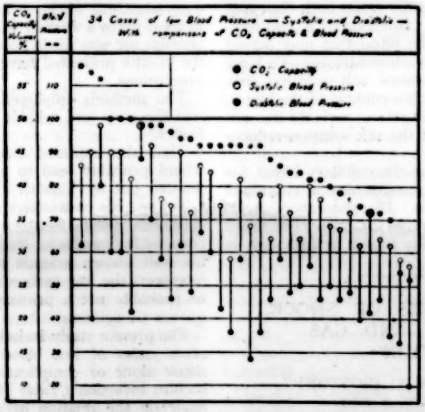
1. Henderson, L. J.: Science, 1913, **37**, 389.
2. Van Slyke and Cullen: Jour. Biol. Chem., 1917, **30**, 291.
3. Van Slyke: Jour. Biol. Chem., 1917, **30**, 347.
4. Myers and Bailey: Jour. Biol. Chem., 1916, **24**, 149.
5. Henderson, Yandell: Am. Jour. Physiol., 1910, **27**, 167, 174.
6. Crile: The Origin and Nature of Emotions, Philadelphia, 1915, p. 227.
7. Henderson, Yandell; Prince, A. L., and Haggard, H. W.: Observations on Surgical Shock, THE JOURNAL A. M. A., Sept. 22, 1917, p. 965.

average carbon dioxid capacity was low, the average mean pressure was likewise low. In the chart are presented the records of blood pressure, systolic and diastolic, in thirty-five cases of shock, hemorrhage and gas infection, arranged in the order of decreasing carbon dioxid capacity (increasing acidosis). From this group moribund patients treated with alkaline drink have been eliminated. The first six of these cases had a carbon dioxid capacity of 50 per cent. or higher, and are not to be regarded, therefore, as instances of acidosis. The remaining twenty-nine cases range roughly in correspondence with the state of the blood.

TABLE 2.—RELATION BETWEEN CARBON DIOXID CAPACITY AND BLOOD PRESSURE

| No. of Cases | Carbon Dioxid Capacity | Mean Arterial Pressure |
|---|---|---|
| 6 | 20 to 29 (av. 24) | 49 mm. hg |
| 8 | 30 to 39 (av. 35) | 59 mm. hg |
| 20 | 40 to 49 (av. 44) | 61 mm. hg |
| 7 | 50 to 59 (av. 53) | 69 mm. hg |

In ten cases classified as uncomplicated shock, the average systolic and diastolic pressures when the blood samples were taken were 77 and 52 mm. of mercury, and the average carbon dioxid capacity was 41 per cent. In seven cases of clear hemorrhage, the relation again was 77 and 52 in blood pressure to 47 per cent. carbon dioxid capacity. And in thirteen cases with gas infection prominent, the average pressures were 70 and 43, with 38 per cent. as the average of the carbon dioxid readings. These groups are perhaps too small to permit conclusions to be drawn. The figures suggest, however, that hemorrhage alone is not attended by as great a reduction of the alkali reserve as is shock (when the blood pressures are equally reduced), and again, when the blood pressure is low, as in the cases of gas infection, the alkali reserve is likely to be correspondingly low.


34 Cases of low Blood Pressure — Systolic and Diastolic —
With comparisons of CO2 Capacity & Blood Pressure
CO2 Capacity
Systolic Blood Pressure
Diastolic Blood Pressure

Records of blood pressure in thirty-five cases of shock, hemorrhage and gas infection, arranged in the order of decreasing carbon dioxid capacity (increasing acidosis).

These observations add another to the known similarities between hemorrhage and shock. In both, the alkaline reserve is lessened. Milroy[8] has recently pointed out that hemorrhage, experimentally induced, is attended by reduction of reserve alkali, and that thereupon exposure of the plasma to the same carbon dioxid concentration as before the hemorrhage develops an H-ion concentration considerably higher than before.

In the cases under consideration no observations were made on the H-ion concentration of the blood. Probably the concentration was not much raised when the alkali reserve was only slightly below normal. The activity of the respiratory center in some cases, however, indicated a markedly increased concentration. These conditions will be dealt with later.

From the evidence presented above, the conclusion is warranted that bodily states characterized by reduced blood pressure and consequently by defective circulation are accompanied by a diminished alkali reserve, and that as a general rule the lower the pressure the lower the reserve. This acidosis should not be compared with that which may occur acutely after a quick run or other sharp exercise. That may be quite as extreme as any change seen in shock, but it is temporary, and the alkaline stores in cells and in other body fluids than the blood may soon compensate for the sudden reduction of available alkali in the blood, and oxidative processes rapidly restore the normal conditions. In the cases under consideration, on the other hand, some process has been going on for hours (often six or eight) that has brought about the state observable at admission of the patient. The progressive character of the process was shown in a case in which the carbon dioxid capacity one hour after the wounding was 50 per cent., and five hours later, with no corrective treatment, had fallen to 40 per cent. The condition has a gradual rather than an acute onset.

### B. RELATION TO PULSE

With low arterial pressure, a rapid pulse may be expected. In the series of cases here reported the heart was seldom beating faster than 144 per minute. Possibly that is a limiting rate for continued action. The average rates were somewhat below this number. Table 3 is arranged on the basis of increasing diastolic pressures.

Since the average pulse rates are fairly uniform for different ranges of low blood pressure, and since, as shown above, there is a relation between the lowness of the pressure and acidosis, it follows that there is no definite relation to be found in our cases between the diminished alkali reserve and the rapidity of the heart beat. If the pulse is considered in these cases arranged on the basis of their carbon dioxid capacity, the average rate for a carbon dioxid capacity of 24 per cent. is 136; of 35 per cent., 135, and of 44 per cent., 130.

TABLE 3.—THE RELATION OF ARTERIAL PRESSURE TO PULSE

| No. of Cases | Average Pressures | | Pulse | |
|---|---|---|---|---|
| | Systolic | Diastolic | Av. Rate | Range |
| 5 | 51 | 23 | 133 | 114-144 |
| 9 | 69 | 35 | 134 | 108-152 |
| 12 | 72 | 44 | 133 | 112-150 |
| 8 | 80 | 55 | 133 | 116-144 |
| 7 | 89 | 62 | 128 | 106-144 |

8. Milroy: Jour. Physiol., 1917, 51, 272.

### C. RELATION TO RESPIRATION

The chemical stimulus increasing respiration is an increase in the H-ion concentration in the arterial blood. As L. J. Henderson[9] has shown, a large amount of acid may be added to a bicarbonate solution similar in concentration to that of the blood before any considerable increase of acidity occurs, so long as the carbon dioxid passes off. The H-ions of the blood do not increase to an important degree, therefore, in spite of reduced alkali, if pulmonary ventilation prevents an accumulation of carbonic acid. Only when this process fails, or acids increase to such a degree as seriously to encroach on the neutralizing power of the bases of the blood, does the increased H-ion content affect in a marked degree the respiratory center. From a study of the alkali reserve, by the Van Slyke method, in a large number of surgical cases Caldwell and Cleveland[10] report no change of respiration when the carbon dioxid capacity was between 43 and 50 per cent., and also none between 36 and 43 per cent. when that condition was stationary; but if the reserve was *diminishing* and had reached that range, hyperpnea was almost always apparent.

The apparatus necessary to record the volume of respired air in the cases under consideration was not at hand, but the rate of breathing was taken. In some of these cases the respiratory rate was probably reduced to a greater or less degree by morphin, which was regularly administered to seriously wounded men in amounts varying from ¼ to ½ grain, with an occasional larger dosage. In Table 4, the chest cases and the abdominal cases have been omitted, for in them the pain due to respiratory movement may modify the breathing in a way complicating the influence of the blood.

As the figures show, the rate increased as the alkali reserve fell, but the change, as was to be expected, became more marked as the limit of the reserve was more nearly approached. The character of the respiration was not noteworthy except in the cases of extreme acidosis, that is, with a carbon dioxid capacity in the region of 30 per cent or lower. In some instances the

TABLE 4.—RELATION OF CARBON DIOXID CAPACITY TO RESPIRATION

| Number of Cases | Carbon Dioxid Capacity | Average Respiratory Rate |
|---|---|---|
| 17 | 40 to 49 (av. 44) | 24 |
| 7 | 30 to 39 (av. 35) | 28 |
| 6 | 20 to 29 (av. 24) | 44 |

breathing was deep and vigorous, as in true "air hunger," and at the rate of 40 or 50 times per minute. These conditions have been met especially in cases of infection with the gas bacillus.

### THE SUGAR CONTENT OF THE BLOOD

Lack of food, or subsistence on a carbohydrate-free diet, as is well known, will produce a condition of acidosis marked by lowered carbon dioxid tension of the alveolar air, increased excretion of ammonia nitrogen in the urine, and the appearance of acetone bodies. The low blood pressure of shock with attendant slight urinary secretion, and the generally depressed state of the patient, render accurate studies of the urine difficult. The possibility of a "starvation" acidosis being present, however, is suggested by the fact that not infrequently men are brought to the casualty clearing station about noon who have been wounded and shocked in a night raid, and who testify to having eaten nothing since the previous afternoon. On admission to the station, they are often too ill to take nourishment. In consequence they may be without food for a time which might be expected to produce metabolic disturbance. A prime condition for "starvation" acidosis is lack of sufficient carbohydrate in the body to play a necessary rôle in the oxidation of fat, in this instance body fat which is being used as a source of energy. Determinations of blood sugar will show, therefore, whether or not a deficiency of carbohydrate prevails. In Table 5 are presented the results of observations in cases of shock and hemorrhage.

TABLE 5.—SUGAR CONTENT OF BLOOD IN CASES OF SHOCK AND HEMORRHAGE

| Initials | Carbon Dioxid Capacity | Blood Sugar | Initials | Carbon Dioxid Capacity | Blood Sugar |
|---|---|---|---|---|---|
| F. W. | 34 | 0.11 | A. H. P. | 47 | 0.10 |
| W. B. | 36 | 0.15 | W. G. | 47 | 0.18 |
| O. C. R. | 40 | 0.15 (6 hours after hit) | O. C. R. | 50 | 0.12 (1 hour after hit) |
| J. B. | 42 | 0.19 | A. S. | 52 | 0.11 (after op'n) |
| H. H. | 42 | 0.22 | A. S. | 60 | 0.12 (before op'n) |

From these observations it is clear, in the first place, that there is no lack of sugar in the blood; indeed, that the amount is commonly above normal—0.1 per cent. Furthermore, there appears to be no relation between variations of the carbon dioxid capacity of the blood and the percentage of sugar. In a few cases urine was obtained from shock cases and tested for acetone bodies. The test for diacetic acid was negative. The acidosis of shock cases, according to this evidence, is due to some other alteration of the blood than the development of acetone bodies.

### THE EFFECT OF ANESTHESIA AND OPERATION ON EXISTENT ACIDOSIS AND LOW BLOOD PRESSURE

That anesthesia and operation are accompanied by a reduction in the alkali reserve of the blood has been shown by Crile and Menten,[11] Austin and Jonas,[12] Morriss,[13] and Caldwell and Cleveland.[10] The largest drop during operation recorded by Austin and Jonas was 10 volumes per cent. carbon dioxid capacity, as determined with the Van Slyke apparatus. The figures reported by Caldwell and Cleveland, based on a study of a large series of cases in which they used the Van Slyke method, show a drop in the carbon dioxid capacity between 4.7 and 7.7 volumes per cent. in operations averaging about fifty minutes in duration. In their series, however, no acidosis was present (except in one case), and the drop barely brought the capacity to the boundary line between normality and acidosis (50 per cent.) It is well known in civil surgical practice that patients with a low alkali reserve (as diabetics with acidosis, and children whose reserve is naturally much lower than that of adults) stand operation poorly, and may pass from anesthesia into coma and die. A highly interesting and practical question, therefore, is raised as to the influence of

9. Henderson, L. J.: The Fitness of the Environment, New York, 1913, pp. 149-151.
10. Caldwell and Cleveland: Surg., Gynec. and Obst., 1917, 25, 23.
11. Crile and Menten: Ann. Surg., 1915, 62, 262.
12. Austin and Jonas: Am. Jour. Med. Sc., 1917, 153, 90.
13. Morriss, W. H.: The Prophylaxis of Anesthesia Acidosis, THE JOURNAL A. M. A., May 12, 1917, p. 1391.

anesthesia and operation on wounded men with an acidosis already existent. In Table 6 are shown the results of blood tests and blood pressure readings before and after operation in cases with a carbon dioxid capacity below 50 per cent. at the start or found below that level at the end of anesthesia.

Comparison of the changes in the blood of these wounded men suffering from shock and unstable circulation with those reported by Caldwell and Cleveland reveals that the average drop in carbon dioxid capacity is approximately twice that seen by them in ordinary civil cases. Furthermore, if the three cases are eliminated which at the start had a carbon dioxid capacity well over 50 per cent., the results show that the fall is likely to be greater the lower the original capacity. The encroachment on the reserve of alkali is greater, therefore, as the margin of safety in the reserve is less. In other words, the more marked the existent acidosis the more sensitive is the patient to operative procedures, and the more likely he is to be let down by them into a region of danger. In ten of the series of cases under consideration the carbon dioxid capacity before operation was 40 *per cent. or less.* The closeness of danger in such cases may be realized by the

TABLE 6.—TESTS AFTER OPERATION IN CASES WITH ACIDOSIS AND LOW BLOOD PRESSURE

| Initials | Duration of Operation | Carbon Dioxid Capacity | | Blood Pressure | |
|---|---|---|---|---|---|
| | | Before Operation | After Operation | Before Operation | After Operation |
| | Mins. | % | % | | |
| S. B. | 75 | 58 | 46 | 82-58 | 58-35 |
| B. S. | 40 | 58 | 46 | 88-62 | 74-42 |
| F. A. T. | 60 | 56 | 40 | 98-60 | 64-48 |
| G. J. H. H. | 45 | 50 | 44 | 90-62 | 84-46 |
| W. C. | 30* | 49 | 40 | 76-58 | — |
| J. H. C. | 45 | 47 | 40 | 102-80 | 80-28 |
| W. A. T. | 60* | 46 | 38 | 78-56 | 68-8 |
| G. K. | 30* | 46 | 27 | 84-60 | 58-36 |
| C. P. H. | 70 | 41 | 28 | 76-46 | — |
| Averages | 52 | 50 | 38 | 88-62 (7 cases) | 62-31 |

* Anesthetized with nitrous oxid and oxygen.

fact that blood taken from the heart at the moment of death from shock has a capacity between 20 and 24 per cent., and in two of the cases reported in Table 6 the capacity fell to 27 and 28 per cent. from an initial 46 and 41 per cent., respectively. Such profound changes may occur in about an hour. The suddenness of this remarkable fall in available alkali is in itself important, for as Caldwell and Cleveland have pointed out, the effects are more damaging when the fall is rapid than when it is slow and gradual. With regard for the baneful effect on internal respiration and on other processes of the body due to an impoverishment of the blood in alkali, it is clear that a rational treatment of shock should include provision against the dangers of this sudden depletion.

Table 6 brings out another important fact of practical importance—the striking fall of blood pressure as a result of operation in these cases. In experience with patients in whom the decrease of the carbon dioxid capacity, as a result of operation, did not extend below 50 per cent. (that is, did not develop an acidosis, in the Van Slyke sense), no noteworthy alteration of arterial pressure occurred. In fact, both the systolic and the diastolic pressure may be higher at the end of operation than at the start, and seldom is there a lowering of the mean pressure. On the other hand, if the carbon dioxid capacity falls below 50 per cent., or being below that level it sinks still lower as a consequence of operation, the blood pressure may suffer an astonishing decline. In the seven complete records in Table 6, the average fall was 88 and 62 to 62 and 36—the systolic pressure at the end of operation was commonly below the diastolic pressure at the start. This ominous sinking of the blood pressure has been repeatedly seen during operation in shock cases in which the alkali reserve was not determined; in all probability these cases should be classified with those in the foregoing list.

Marshall[14] has testified that anesthesia with nitrous oxid and oxygen is specially to be recommended in operating on men in shock, because it leaves the patient in much better condition than do other anesthetics. Crile and Lower[15] also have stated that nitrous oxid-oxygen anesthesia is less likely to increase shock than ether. In two patients in the present series, blood examination before and after operation with nitrous-oxid-oxygen as the anesthetic, there was no change whatever in the carbon oxid capacity; it remained at 58 per cent. in the one, and at 48 per cent. in the other during operations lasting forty and twenty-three minutes, respectively. That this anesthetic does not preclude a fall of blood pressure and an attendant alkali reduction is shown by the three cases in Table 6 distinguished by asterisks—patients anesthetized with nitrous oxid and oxygen. The rate of change in the second of these three, however, was less than in any of the others, and the blood pressure was only slightly reduced. The charted results presented by Caldwell and Cleveland show not quite so great a decrease of the carbon dioxid capacity under "gas" and oxygen as under ether, but they conclude that the differences under different anesthetics are negligible. The possibility that the patient anesthetized with nitrous oxid and oxygen may suffer no appreciable blood change, and also that such changes as have been recorded may be due in part to lack of skill (as in allowing the patient to become cyanosed), gives support to the judgment that it is the anesthetic to be employed when possible in operating in cases of shock.

## Alkaline Treatment of Extreme Acidosis in Shock

The danger zone that shocked men are liable to enter when they are operated on is approached, as already explained, through a precipitous fall of blood pressure and a sharp decrease of the alkali reserve to a degree at which the H-ion concentration of the blood tends to increase rapidly. The harmful effects on tissue respiration and on other bodily functions that occur when the H-ions are increased have already been emphasized. Wright[16] had reported a lessening of the alkalinity of the blood in human beings and in lower animals infected with the gas bacillus, a condition which he designated as "acidemia." The evidence presented above shows that this condition is not peculiar to toxic shock with gas infection,[17] but is general for states of low blood pressure, whether due

14. Marshall: Proc. Roy. Soc. Med., 1917, **10**, 27.
15. Crile and Lower: Anoci-Association, Philadelphia, 1914, p. 78.
16. Wright: Lancet, London, 1917, **1**, 1.
17. The importance of a good circulation for checking the spread of gas infection has been remarked by a number of writers on the subject. Attention has been directed mainly, however, to local tensions in the tissues and to thrombosis as the occasions for a poor blood supply. That a low general blood pressure may lie behind the local impairment should be more generally recognized.

to wounds or hemorrhage, without notable infection. The toxemia is merely an additive factor. The rational treatment of patients with diminished alkali in the blood, as has long been recognized in dealing with the acidosis of diabetes, is to supply alkali. Wright suggested this therapy also for treatment of gas infection, and reported good results in two instances. Its use in combating the extreme acidosis that may follow operation on men in shock is shown by the following cases:

Private J. F. J. was admitted, July 27, with multiple shell wounds of the leg, knee, right forearm, chest, and right hand. Considerable hemorrhage was probable. Before operation blood pressure was: systolic 80, diastolic 58, pulse 134, respiration 24, and not peculiar. The carbon dioxid capacity was 43 per cent. At operation the left knee was resected, about 6 inches of the right gastrocnemius removed, a long slit was made in the right forearm with excision of the flexor longus digitorum, and the ring and little fingers of the right hand, with their metacarpals, were taken away. Evidence of gas infection was found.

Shortly after recovery from the anesthesia, the blood pressure was 68 and 40, pulse 148, and respiration 34, deep and vigorous. An hour later, at 10:30 p. m., the pulse was still as before, but the respiration had risen to 48, and was as energetic as if there had been violent struggle. In spite of his wounds, the patient tried to sit up, crying, "I must have air. I can't breathe." A cannula was slipped into an elbow vein, and 35 ounces of warm 4 per cent. sodium bicarbonate were introduced. A most dramatic change at once occurred. The patient's restlessness and "air hunger" immediately disappeared, and in a few minutes he fell asleep with a pulse of 126, and quiet respirations 26 per minute. A second respiratory crisis during the night required another injection of the sodium bicarbonate solution. Alkaline treatment was continued by mouth—1 dram in 8 ounces of sweetened water every two hours. On the following morning the patient was found smoking a cigaret. In the afternoon the blood pressure was 114 and 56, pulse 132, respiration 28. The second day the blood pressure was 128 and 58, pulse 144, respiration 38, but gas infection was found in the calves of both legs. In the subsequent operation considerable blood was lost. The patient sank rapidly thereafter, and died in about three hours.

Private H. (not in tabulation) was admitted, July 27, with multiple shell wounds. There was a big opening in the left loin with fracture of the pelvis and infection of the muscles; extensive lacerations of the left thigh, the left calf, and the right calf, with gas infection; many superficial wounds of back and chest and left hand. He was operated on at 11 p. m., but records of his blood pressure were not taken. About 6 o'clock the next morning his pulse was 150, and he was suffering from typical "air hunger" with deep respirations approximately 60 a minute. He was given intravenously 2 pints of warm 4 per cent. sodium bicarbonate. He became quiet at once, and fell asleep. Alkaline treatment was continued by mouth. At 12:30 p. m. the blood pressure was 72 and 56, pulse 140, and respiration 32. The carbon dioxid capacity was 51 per cent. In the afternoon the blood pressure was 104 and 68, pulse 132, respiration 27. The condition was the same next morning, except that the blood pressure had risen to 114 and 72. The patient then began to have an oscillating fever temperature; a foot wound was found infected, and the pathologist reported a coccus in the blood. A blood destruction started, and at the end of a week the red count fell to 1,800,000, hemoglobin 30 per cent. Transfusion was done, with consequent improvement. The patient was evacuated, but died of pneumonia in a hospital at the base.

"Air hunger" in such cases is typically a signal of impending death. The results described in the foregoing records demonstrate that the desperate state of the patient suffering from the marked acidosis of traumatic and toxic shock may be so changed by intravenous alkaline therapy that with astonishing suddenness he passes from distress to comfort, and may later recover normal blood pressure. These cases also indicate, however, that the individual who has passed through such a crisis appears to have little resistance and is exposed to dangers of subsequent infection.

The development of acidosis in shock and its serious aggravation by surgical procedures suggested the desirability of using, if possible, preventive measures—increasing the chances of survival for wounded men by avoidance of critical risks. To throw light on these possibilities, the natural history of the shocked individual should be known. For the purpose of securing this knowledge, Captain Cowell went to the front trenches to study cases which were later traced through the aid post and the dressing station to the casualty clearing station. The results of this study are given in the following paper.

### SUMMARY

Cases of low blood pressure due to shock, hemorrhage, or infection with the gas bacillus have a diminished supply of available alkali in the blood, that is, an acidosis. As a general rule, the lower the pressure the more marked the acidosis.

The pulse is rapid in these cases, but does not vary with the degree of acidosis.

The respiratory rate becomes more rapid as the acidosis increases until, shortly before death, a true "air hunger" may prevail.

Blood sugar is usually somewhat increased above the normal in cases of shock and hemorrhage. The acidosis in these cases, therefore, is not due to lack of circulating carbohydrate.

Operation on men suffering from shock and acidosis results in serious and rapid sinking of arterial pressure when it is already low, and in marked and sudden decrease of the alkali reserve of the blood when that reserve likewise is already low. This change may not occur if nitrous oxid-oxygen anesthesia, instead of ether, is employed, but that anesthetic affords no guarantee against the ominous decline.

Shocked men suffering after operation from extreme acidosis with "air hunger" can be quickly relieved of their distress by intravenous injection of a solution of sodium bicarbonate, and their blood pressure restored to normal.

*(To be continued)*

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**The Responsibilities of War.**—Courage, fortitude, loyalty and self denial strengthen and ennoble. They are the virtues of calm weather, more eminently of days of storm and stress. War permits no flights from responsibility. Every obligation becomes more binding, both in relation to the personal life and the good of the whole—the community or state. It may seem a paradox that in time of war when life appears to be held most cheap, life and health come to be thought of as most valuable. The reason is plain. Physical vigor, physical endurance, physical power begin to have an increasing value in the minds of men. Man—the physical man—counts, and men begin to make the most of men. The attitude toward man is the same as that toward the newest kind of rifle or the latest type of cannon. What is the best kind and what characteristics are most useful. Even with our brief experience we have awakened to the nation's need for men with fewer physical defects and greater physical power. The nation is beginning to see that if there had been more interest in public health in time of peace there would be now less need for long months of training for endurance of necessary hardships incident to camp life.—Oscar Dowling, M.D., *Quart. Bull.*, Louisiana State Board of Health, December, 1917.

## Special Article

# SYNTHETIC DRUGS *

JULIUS STIEGLITZ, Ph.D., Sc.D., Chem.D.
Professor and Chairman, Department of Chemistry, and Director of the Laboratories, University of Chicago; Chairman, Subcommittee on Synthetic Drugs, National Research Council
CHICAGO

The work of the Federal Trade Commission in cooperation with the Committee on Synthetic Drugs of the National Research Council in providing for the manufacture in this country of the important synthetic drugs which before the war were imported from abroad, and especially from Germany, has now passed through its first stage of development. Although supplies in some articles will not be overplentiful for some weeks yet, and plans for the manufacture of some important drugs, such as phenylbarbital (luminal) are still in the stage of preparative study only, the situation has defined itself so far that its further successful development can best be attained by the frank and hearty cooperation of the medical profession with the Federal Trade Commission and the National Research Council. The purpose of this series of short articles is to insure such cooperation, first by giving specific information to physicians, second, by requesting in return specific methods of support by physicians, and third, by inviting constructive suggestions.

This first article is devoted to a report concerning three of the most necessary drugs involved, Arsphenamine (introduced as salvarsan), Procaine (introduced as novocaine), Barbital (introduced as veronal) and Barbital-sodium (introduced as veronal-sodium and as medinal). The report will not be limited to licensed articles, and is intended to give information of the whole situation of synthetic drugs, as it is known to the committee at present.

### General Use of the New Official Names

The first and one of the most important matters to be brought to the attention of American physicians is an appeal to them to *prescribe the licensed remedies by the new official names given above.* This may seem a trifling matter; but a few words of explanation of the reasons for the adoption of these names should suffice to show the underlying seriousness of the request. In meeting the urgent demand for synthetic drugs, the Federal Trade Commission and the committee of the National Research Council faced the necessity of making it worth while for manufacturers to undertake the preparation of these articles, often at the cost of large investments, without permitting the cost to the public to become prohibitive—in fact, making it possible to restore the cost, in some cases gradually, to the normal basis that obtained before the war. This could more easily be accomplished by granting licenses *good for the life of patents and not only for the duration of the war,* making possible a permanent investment with normal profits rather than necessitating a "war investment," the capital of which had to be paid for by exorbitant "war profits." Partly in order to help insure to licensees a market for their products after the war, in larger part inspired by the idea of encouraging the establishment of a permanent American industry in these important articles, the Commission wisely decided that American houses should be put on the same footing as competing foreign houses for the after-the-war competition, by imposing on all licensees the obligation to use *new official names* for the articles, names which after the war will be open to all competitors, domestic and foreign. Obviously if these names are once in common use the exclusive rights of the foreign houses and their agents of using after the war the old established trade marked names would not seriously handicap American firms, and all competitors would be on the same footing, with the advantage only to those who could produce most cheaply the better articles. The owners of the original patents after the war will continue to receive the royalties adjudged to them by the courts; and for any loss of advantage resting in a monopoly, enemy countries must hold themselves directly responsible in view of the way in which our nation was drawn into the war. *It is obvious* that the American physician in final instance is the arbiter who can put this wise plan into operation and *establish the new names firmly* by prescribing these remedies by their new official names, *supplemented, if desired,* by the name of the manufacturing firm to indicate any brand demanded. Thus, "Arsphenamine-Dermatological Laboratories" is as expressive as "Arsenobenzol-Schamberg," and "Arsphenamine-Farbwerke-Hoechst" far better for the interests of the country, of patients and physicians, than "Salvarsan-Farbwerke-Hoechst."

An appeal will be made to medical journals to use the new official names in all advertising and all articles and editorials. Thus, with the cooperation of all loyal Americans we may wish Godspeed to the new American industry to which the throes of warfare have given birth, that we may never again face the intolerable situation of seeing our patients suffer and die from the absence of absolutely necessary medicinals, never again hear of "Bulgarian operations" at our hospitals for lack of proper anesthetics!

### The Cost of Synthetics Under License

Turning now to the matter of cost of the new remedies, we find that it has been possible in only a single instance, that of arsphenamine, to make an exact estimate of a legitimate price for the drug; and in this instance a price has been imposed on the licensees, and willingly accepted by them, that I understand is much lower than the price of the imported article was before the war: $1.50 per dose when sold to the private practitioner and a price of a dollar or less per normal dose when sold in large ampules to hospitals is certainly a situation on which the country is to be congratulated in the face of the war prices that obtained before our entry into the war and immediately thereafter. In the cases of procaine and barbital, direct price regulation has thus far seemed unwise because of the difficulty of gaging the actual cost to manfacturers. On the other hand, a sufficient number of licenses have been issued with the view of insuring a fair price by forced competition. In no instance has an exclusive license been granted by the Federal Trade Commission, although applications for exclusive licenses were made to it. It is safe to predict that no exclusive licenses will be granted in the future. If normal competition does not bring about a tolerable situation in regard to prices, the Commission has reserved the right to impose a limit of price when the situation would demand and warrant such a course.

* The information conveyed in these articles is based on the latest reports to the writer: it is probably not complete as to all details, but is published now to avoid further delay in bringing the main facts before the medical profession. The writer will be glad to receive information to be used later according to his best judgment.

The number of licenses issued for the manufacture of a given article has been small but sufficient, and there is nothing in the way of a change of policy if a change should seem wise. A limited number of licenses for a given article is thought to insure its manufacture at a reasonable price to the public and at a reasonable profit to the manufacturer. Too many licenses for a single article would lead to overproduction; few good houses would have entered the field without some assurance that the Commission is anxious to protect in a reasonable degree both the public and the manufacturer. Moreover, this policy has secured the manufacture of almost all the most urgently needed drugs by various houses without allowing them to concentrate on the most profitable one or two.

### THE CONTROL OF SYNTHETICS UNDER LICENSE

Before licenses were issued by the Federal Trade Commission, the latter insisted on submission of the products of the applicants to the Public Health Service, in the case of arsphenamine, or, in the case of other medicinals, to the Committee on Synthetic Drugs for examination by the Chemical Laboratory of the Council on Pharmacy and Chemistry of the American Medical Association and for such other tests as were deemed wise. The Council will buy samples in the open market and seek to protect the public against any falling off in the standards.

### PRESENT STATUS OF SYNTHETICS UNDER LICENSE

Now as to specific information concerning four of the most important of the synthetic drugs, we have the following to report:

1. *Arsphenamine.*—This official name for the drug introduced as salvarsan is a contraction of its more scientific name, arsenophenolaminehydrochloride. *Manufacturing* licenses have been issued to: Farbwerke-Hoechst Company (H. A. Metz), 11 Hudson Street, New York, which controlled the sale of salvarsan imported from Germany; Dermatological Research Laboratories, Philadelphia Polyclinic (Dr. J. F. Schamberg), which even before our entrance into the war manufactured the well known Arsenobenzol brand of Arsphenamine; the Takamine Laboratories, New York, which have in their employ Dr. Hata, with Ehrlich, the co-discoverer of the remedy.

An importing license has been issued for the Canadian brand of Arsphenamine, Diarsenol, and a further license most likely will be issued for the importation of the French or Billon brand.

In this way provision has been made for five independent sources of supply of this important drug, the quality of which is being controlled by the Public Health Service. All but the Takamine Laboratories are now producing arsphenamine in thousands of doses per day, and the price for the supply of physicians, as stated above, has been fixed at $1.50 per ampule of 0.6 gm. It is true that the major part of the production of the two American manufacturing establishments which are in full operation is still going quite rightly for the supply of the Army and Navy; but as large a proportion as circumstances permit is already available for the public. There is no ground for exorbitant prices, and physicians are urgently invited to report with full details any cases of extortion as well as of inability to secure moderate supplies either directly to the Federal Trade Commission in Washington, or to the writer of this article.

2. The licensees for arsphenamine are preparing to manufacture the neo-arsphenamine as well. Licenses for its manufacture will shortly be issued, the Public Health Service being engaged in drawing up standards for its purity. This product will be licensed primarily for the convenience of physicians and not as an absolute necessity, arsphenamine being more easily prepared pure on a large scale. It should be added that other promising methods of convenient administration of arsphenamine itself are under investigation which, if successful, will go far toward solving the chief objection to its use.

3. *Procaine* is the official name of the product introduced as novocaine. It is the hydrochloride of diethylamino-ethyl-para-amino-benzoate.

The name is a contraction of pro-cocaine, the drug being a substitute for cocaine. Licenses for its manufacture have been issued to: Farbwerke-Hoechst Company, 111 Hudson Street, New York, the holder of the agency for the German product before the war; the Rector Chemical Company, 50 East Forty-first Street, New York, which has had the assistance of Professor Bailey of the University of Texas in elaborating the process of manufacture; the Abbott Laboratories, Ravenswood, Chicago, which have been assisted by Prof. Roger Adams of the University of Illinois; the Calco Chemical Company, Bound Brook, N. J., which has benefited by the advice of Prof. T. B. Johnson of Yale University.

Before a license was granted to any one of these firms, its preparation was submitted to our subcommittee on synthetic drugs, and tested by the Council on Pharmacy and Chemistry, chemically at the laboratory of the American Medical Association, and pharmacologically by Prof. R. A. Hatcher of Cornell University Medical School, a member of the Council. Procaine is a difficult preparation, requiring many operations and materials for its manufacture, which it has not been easy to secure; but rapid progress has been made in overcoming all the obstacles, and there should be no further difficulty in securing sufficient supplies of the drug for the most necessary purposes and ultimately for all needs.

In this connection it should be said that Parke, Davis & Co. have invented a new cocaine substitute, *Apothesine*, the hydrochloride of diethylamino-propyl cinnamate. It has been tested by a number of eminent surgeons and found to be quite as effective and about as safe as procaine itself, to which it is rather closely related in structure. There is a field here for further discovery of products that would be as effective and even more easily prepared.

4. *Barbital* is the official name of the product introduced as veronal. The word is a contraction of its chemical name, diethyl-barbituric acid. A license has been issued to: the Abbott Laboratories, Ravenswood, Chicago. A license will be issued shortly, or has already been issued to the Antoine-Chiris Company, 18 Platt Street, New York.

The products of these firms have been tested in the laboratory of the American Medical Association at the request of the Committee and found satisfactory.

The Bayer Chemical Company, 117 Hudson Street, New York, and Merck & Co., 45 Park Place, New York, are reported to have supplies of barbital, presumably imported.

*Barbital-Sodium* is available from Merck & Co., New York. No doubt, licenses for its manufacture will be secured by the licensees of the mother substance, Barbital.

*(To be continued)*

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SATURDAY, FEBRUARY 23, 1918

## FOOD INSPECTION AND FOOD CONTROL

If it is true that public health is purchasable, it is also true that limited expenditures will not procure unlimited talent or unlimited results. The upshot of this indisputable statement is that community health work ought to assume a pragmatic attitude to the extent of undertaking foremost those procedures which pay well from the standpoint of good returns in lives saved and disease prevented. The evolution of modern public health activities has been gradual; it is still far from a complete or ideal stage. Progress in science has pointed year after year to the desirability of new measures in preventive medicine; but it has also often directed attention to the inefficacy of earlier procedures and given justification for their modification or abandonment. Nevertheless, the prestige of an established custom, whether it is in trade, in diet, or in practical hygiene, is not infrequently so firm that something more than scientific argument is needed to uproot or replace it.

The history of household disinfection and room fumigation would furnish illustrations of what has just been contended. The practice of the disinfection of habitations has undergone great revision, not without a feeling of uncertainty on the part of many as to loss of the supposed security against recurrence of certain types of diseases for which fumigation was once extensively carried out, after the removal of the patient. But, as a hygienist has cleverly expressed the situation, the old, ill founded idea that health work is to be centered on the environment has been displaced by the modern one, well supported by the data of science, that it is concerned directly with men and women. This does not mean that household disinfection or school disinfection is to be entirely discarded, but rather that the value of specific procedures of the past are to be evaluated on the basis of epidemiologic evidence rather than traditional assumption, as heretofore.

Two recent writers competent to discuss the values of modern health work have raised the question, directly or indirectly, as to the efficacy of much of the current work or propaganda in the domain of food hygiene. Dr. Chapin,[1] the superintendent of health at Providence, R. I., in attempting to combat the popular notion that the principal functions of a city health department are sanitation and food control, has remarked:

> Another time-honored and popular means of promoting the public health is control of the food supply. This control naturally is divided into the prevention of adulteration and the promotion of cleanliness. Though there is much lurid literature on the dangers of impure food, as a general thing adulterants are as likely to be healthful as unhealthful. Adulteration, with rare exception, is an economic and not a health problem. There is almost as much nonsense written about ptomain poisoning as there is about adulteration.[2] "Ptomain poisoning" is the popular name for disorders arising from bacterial changes in food. Of such we really know little except that they are not nearly so common as is believed, and that the routine inspection and condemnation of cabbages and corned beef, as practiced by our city health officials, probably has no effect in restricting the somewhat rare occurrence of such poisonings.

It is, of course, readily admitted that infections may be food borne. The story of the part played by milk in the distribution of epidemic sore throat, typhoid fever, scarlet fever and tuberculosis need not be rehearsed here as evidence. But Jordan,[3] of the University of Chicago, in emphasizing the bacteriologic aspects of the subject points out that, after all, the current methods for preventing food infection (which certainly is not as innocuous as the most usual adulterations in the chemical sense) are not those of the simple inspection of food products. The chief infections that are known to be due to food infected at its source, says Jordan, are those—mainly meat borne—caused by the group of paratyphoid-enteritidis bacteria and those resulting from the use of infected milk. For this reason it is questioned "whether the amount of disease prevented by the ordinary methods of food inspection is at all commensurate with the outlay."

It would be reckless, indeed, to abandon the careful supervision of our milk supplies in any detail that makes for health, whether it be in the direction of examination of the persons handling this food or of effective pasteurization, or of any other hygienic device that has justified itself. Even harmless water may render milk of poor nutritive value to children, and surely skimmed milk has lost a component of no little significance for the young. It may well be debated, on the other hand, whether much or even most of the currently practiced food inspection "pays" from the standpoint of lives saved. From this standpoint clean streets may not "pay," and whitewashed barns may not prevent the loss of health. Nevertheless, modern civilization demands these and even more. Whether the campaigns for cleanliness in home, factory and outdoor premises ought to be directed from the office

1. Chapin, C. V.: The Relative Values of Public Health Procedures, The Journal A. M. A., July 14 1917, p. 90.
2. Ptomain Poisoning versus Food-Borne Infection, editorial, The Journal A. M. A., Feb. 16, 1918, p. 462.
3. Jordan, E. O.: Food-Borne Infections, Science, Jan. 25, 1918, p. 80.

of the public health authorities or financed from their all too limited funds is a question for frank debate. But we cannot afford to give up the esthetic acquisitions of modern life. Nor are we to forget that, harmless though most fraudulent adulterations are, they are not always safe. The Bureau of Chemistry only recently saved us from the hidden dangers of poisonous beans imported by unscrupulous persons and ready to be unloaded on an unsuspecting public. Modern food control has insisted on honesty and purity in matters that concern our daily lives. We must retain this valuable force intact in our public welfare organization—somewhere.

## THE OWEN-DYER BILL FOR INCREASED RANK

Last week we printed the text of a bill just introduced simultaneously in the Senate by Senator Owen and in the House by Representative Dyer. The numbers are, respectively, S. 3748 and H. R. 9563. These bills consist of two paragraphs. The first reads:

"That hereafter the commissioned officers of the Medical Corps, and of the Medical Reserve Corps, of the United States Army on active duty shall be distributed in the several grades in the same ratios heretofore established by law in the Medical Corps of the United States Navy."

The bill is essentially the same as that introduced by Senator Owen last July. The latter—the Owen bill of July—provided definite percentages which should be applied to the distribution of the various grades in the Army. These were the same as apply to the Navy. The Owen-Dyer bill provides that the officers of the Medical Corps and of the Medical Reserve Corps of the Army on active duty shall be distributed in grades in the same percentages as established for the Navy: the end-results are the same The wording of the present bill is undoubtedly more diplomatic, since it presents to senators and congressmen a simple request to grant to one branch of the Service the same ranks as prevail in another branch of the Service which performs essentially the same duties and fulfils the same requirements.

The following table shows the percentage distribution in the various grades of the regular Army and Navy medical corps as at present constituted:

| Army Present Law Per Cent. | | Navy Present Law Per Cent. |
|---|---|---|
| Lieutenants ..... | | Lieut. Junior Grade..... |
| Captains .....67.2 | | Lieut. .....64 |
| Majors .....23.7 | | Lieut.-Commander .....23.5 |
| Lieut.-Colonels ..... 5.42 | | Medical Inspector (Comm.) ..... 8 |
| Colonels ..... 3.16 | | Medical Director (Capt.) 4 |
| Brigadier-Generals .....None[1] | | Medical Director (Rear Admiral) ..... 0.5 |

It must be borne in mind in considering the above table in its relation to the proposed legislation that the distribution given in the table applies, so far as the Army is concerned, only to the regular Medical Corps; it does not apply to the Medical Reserve Corps. The Medical Reserve Corps, as constituted by the National Defense Act, is limited in rank to the three grades of lieutenant, captain and major, with no percentage limitations.

The Owen-Dyer bill provides, first, higher grades and an increased percentage of officers in the higher grades. Second, and this is important, the bill provides that an officer in the Medical Reserve Corps on active duty may achieve the same rank as an officer in the regular Medical Corps. If the bill becomes a law, including both the regular Corps and Medical Reserve Corps, and basing the percentage estimate on 20,000 officers in active service (required for an army of 2,750,000 men), there may be 100 brigadier-generals, 800 colonels, 1,600 lieutenant-colonels, 4,700 majors, and 12,800 captains and lieutenants.

Both the Owen bill of last July and the present Owen-Dyer bill provide for the appointment of "consultants." The paragraph in the former reads:

"The President shall have authority to appoint officers of either corps as 'consultants,' with the duty of acting in an advisory capacity, making inspections and reports on medical, surgical, or sanitary questions, and such other duties as may be required by the chief of the Medical Department."

The following is the paragraph in the new Owen-Dyer bill:

"The Surgeon-General shall have authority to designate as 'consultants' officers of either corps and retire them as the interests of the service may require."

It will be noted that the first bill assigned to the President the authority to appoint these consultants, and defined their duties. The Owen-Dyer bill gives the Surgeon-General the right of appointment, but it does not specify what the duties of these consultants shall be.

The Owen-Dyer bill will, we are sure, have the approval of every physician, whether he be in the Medical Corps, in the Medical Reserve Corps, or a private in the ranks of the general profession. It is not only a bill that we can heartily endorse, but also one that we should feel it a duty to support. But those who write to their congressmen or senators should inform them that the increased rank, and the authority which goes with it, is desired not for the increased pay which will come with the advanced rank, nor as a salve to the pride of these officers, but primarily in the interest of sanitary and health conditions of our army and as common justice to men who are making tremendous sacrifices. Nevertheless, whatever may be the verdict of Congress in this matter, medical men will play the game and do their duty; but Congress should be given to understand that these men at the present time are working under a heavy handicap which a wise Congress will remove without delay.

1. Surgeon-General Gorgas is a Major-General by special act of Congress. Ordinarily the Surgeon-General is a Brigadier-General.

## CARDIOVASCULAR EXAMINATIONS

Among the many problems presented to the physician examining prospective candidates for the Army, none is more perplexing than that of the heart. What constitutes proof of disqualifying cardiac conditions? Of course in most instances the answer is clear; even on closest scrutiny, the heart is free from any sign or symptom of disease, or, on the other hand, the history and examination reveal unmistakable evidence of organic mischief in valve or muscle. The more questionable cases are those in which the rate, rhythm or size are not according to the generally accepted standards, or those in which an endocardial murmur arrests attention. What, under these circumstances, constitutes fitness, and what unfitness? And particularly how is one to decide when, as in the case of the man trying to break into the Army, the symptoms of heart inefficiency are minimized or glossed over, or, in the case of the young man anxious to escape the draft, symptoms are magnified and perhaps the heart's action made unnatural so far as possible by the use of irritants, such as alcohol, tobacco, coffee or drugs?

Hard and fast rules to govern in these cases cannot be laid down. Each case must be studied on its own merits, and much will depend on the skill of the physician in physical examination, on his soundness of judgment, and on his ability to read disease in general and heart disease in particular. A good all-round physician whose experience has taught him to understand human nature will sometimes make a better diagnosis of the fitness of a candidate with doubtful heart than the more learned and scientific man with acute powers of auscultation and with all the refinements of diagnosis that go with modern instruments of precision. Common sense, experience and a sizing up of conditions in their entirety may here reach the correct conclusion that would be missed were one to rely on the presence or absence of murmur, the pulse pressure, the rhythm, the rate before and after exertion, or the instrumental record.

One difficulty in these examinations has been the question of endocardial murmur. In the minds of many examiners it bulks large; no matter how faint or where located, its discovery is sufficient to cause rejection. The fact is ignored that some murmurs are innocent and do not mean any incapacitating lesion of valves or muscles. Teachers and writers have written much on the topic, but the teaching is too often unknown or unheeded and needs to be frequently repeated. It is valuable to have Dr. Babcock emphasize the importance of the association of the murmur with change in the size of the heart, altered second tones, dyspnea, cyanosis, etc., before concluding that there is serious disease, which he did in a recent article in THE JOURNAL.[1] Many candidates with murmur but without these secondary signs are eminently fit for Army service.

While what we have said is true, we must emphasize a possible danger in this direction: the danger of minimizing some of the signs of slight cardiac derangement and of ordering into Army service men who, under the severe strain of military life, will have their mild heart difficulties aggravated so that ultimately their hearts may break down. Persistent emphasis by teachers on the innocuousness of an accidental murmur, warning from men like Babcock as to the injustice of rejecting a man on his murmur alone, emphasis by Christian,[2] Lewis and others on the comparative unimportance of the murmur, caustic comment by an honored authority like Mackenzie may ultimately undermine the orthodox faith of the ordinary doctor, and he may renounce entirely his belief in the meaning of endocardial murmurs. The same is true of extrasystole. And this danger is increased because it is to be remembered that the instructions given the Army examining physician as well as the physician on the selective service exemption boards especially call attention to the fact that the murmur alone is not proof of incapacitating disease of the heart. These instructions, by the way, seem to be unknown to some who are free in their criticism of the Army or draft board examination, and who seem to take it for granted that the working orders issued by the government imply rejection for murmur alone.

And now, after all has been said about the relative meaninglessness of certain murmurs and extrasystoles and tachycardias, must we not admit that, given one of these departures from the normal, the burden of proof is with the one who claims their insignificance? Grant that the outdoor life, the regular military drill may benefit a flabby myocardium; grant that the mitral leak may be slight, the secondary changes not manifest even to careful examination; grant that the heart is competent to meet all ordinary demands of civilian life; the question is, Will it be able to stand up under the storm and stress of the Army? Can it meet the sudden emergencies, the exposures, the physical and nervous shock that will come? May it not break down in a few years? Must we not feel that an injustice has been done the man in forcing on him a lifelong damage that will shorten his years, an injustice to the Army whose soldier fails perhaps at some critical moment, and an injustice to the government that is forced to pay the pension or the insurance because of the faulty original examination? If albuminuria in one who has no other sign of disease rules one out of service, or slight latent tuberculosis of the lung, or a minute hernial protrusion or even a patulous inguinal ring, all for the reason that there is likelihood that Army service may aggravate existing conditions, even though these in no way interfere with one's active

1. Babcock, R. H.: Prognosis in Cardiac Affections, THE JOURNAL A. M. A., Feb. 9, 1918, p. 357.

2. Christian, H. A.: Boston Med. and Surg. Jour., 1917, 177, 750.

participation in civilian life, should not even slight cardiac faults be noted and the man be accepted as a soldier only after scrutinizing proof that these signs are clearly not indicative of actual lesion?

As we said before, no hard and fast rule applies; each case must be judged on its own merits; and here is where the patient application of trained skill and good judgment will avail much.

## Current Comment

### THE WORK OF THE MEDICAL ADVISORY BOARDS

As was suggested in THE JOURNAL a few weeks ago, the effect of the special regulations for physical examinations of registrants issued to the local boards has been to throw the large portion of examinations on the medical advisory boards. And from what we can learn, the medical advisory boards, especially in large cities, while they are straining under this heavy burden, working some of them often far into the night, making considerable financial outlay from their private purses to fill in shortages in equipment and in clerical service, are nevertheless rendering their duty, as was predicted, wholeheartedly and efficiently. It is, of course, only after the men are called to camp that the great saving to the nation through this elimination of the unfit at the source will be realized. The defect in the entire system is that these men, as well as medical members of local and district boards, who are giving such excellent service and such large measure of their time and efforts do not receive any consideration from the government, either financial, material or otherwise. Would it not be a proper measure to recognize these men by conferring some appropriate insignia or certificate?

### BENCE-JONES PROTEINURIA

Although the syndrome of heart block has been known for nearly a hundred years, the frequency of its occurrence was not appreciated until within the past two decades, when the more erudite investigation of its details by modern laboratory methods focused attention on the scientific aspects. Accuracy in diagnosis brought with it a more widespread recognition or identification of cases of Adams-Stokes disease. Perhaps a somewhat similar history is about to be written for another long known abnormality, familiarly termed Bence-Jones proteinuria. At present this may still be classified among the rarities of clinical experience. It is usually associated with diseases of the bone marrow, notably multiple myeloma.[1] Miller and Baetjer[2] of Baltimore have recently described the existence of Bence-Jones protein, or some substance similar to it in behavior, as the only protein excreted in the urine in cases of chronic nephritis with edema and high blood pressure. The identification of several cases by the same investigators within a few months suggests that the association of Bence-Jones proteinuria, hypertension and nephritis may not even be uncommon, and that, as they say, attention called to this matter will result in the finding of more instances. When the further evidence thus predicted as likely to be forthcoming will be available, it may become possible to determine whether Bence-Jones proteinuria represents "either the normal, abnormal or aberrant stage of bone synthesis, the completion of which is hindered by some unknown deficiency, in association with some unusual set of physicochemical adjustments which permit the compound to pass through an organ capable of holding back smaller protein molecules." In any event, it behooves us to learn the tests for the Bence-Jones protein and to be on the lookout for its appearance in the urine, even when disease of the bones is not suspected.

1. Rosenbloom, J.: A Review of the History of Bence-Jones Protein and Multiple Myeloma, with Complete Bibliography, Med. and Surg., 1917, 1, 257.
2. Miller, S. R., and Baetjer, W. A.: Bence-Jones Proteinuria: Some Observations on Its Occurrence, with Particular Reference to Nephritis and Hypertension, THE JOURNAL A. M. A., Jan. 19, 1918, p. 137.

### THE POSSIBLE SIGNIFICANCE OF HIGH SUGAR CONTENT IN DIABETES

Those who have occasion to estimate the sugar content of the blood of diabetics and to evaluate the data for therapeutic guidance must now and then be puzzled by the wide variations that occur at different times in the same person. A large experience acquired at the Medical Clinic of the Johns Hopkins Hospital has furnished the basis for certain new points of view, which Mosenthal, Clausen and Hiller[1] have formulated in a recent publication. They point out that, according to the observations of Hamman and Hirschman,[2] superimposed doses of glucose are not necessarily followed by a steplike rise in the blood sugar. It is only the first dose that causes the percentage to rise; the subsequent doses apparently have no effect. Mosenthal and his colleagues have noted that the blood sugar values remain at the fasting level or below it throughout the day in those cases in which the initial hyperglycemia is marked (for example, from 0.17 to 0.45 per cent.); whereas it rises in those in which it is low (from 0.12 to 0.16 per cent.). It seems, to quote the Baltimore clinicians, that each diabetic has a blood sugar level at which his carbohydrate metabolism proceeds in a fairly normal manner, with no rise in the blood sugar after meals of a moderate starch content. In very mild cases, they state, this acquired blood sugar level may be very low and no increase result after the eating of a starch-free meal; whereas, in individuals with a very marked derangement in their carbohydrate metabolism, such a favorable blood sugar level will be proportionately increased. When this optimal glucose percentage in the blood is reduced by dietary restrictions, the organism tends to respond on the least provocation by a hyperglycemia. It is under such circumstances that there occurs an increase in the glucose of the blood after ingestion of protein and fat. The contention that the organism tends to utilize glucose more effectively when the blood sugar is at a high level than at a low

1. Mosenthal, H. O.; Clausen, S. W., and Hiller, Alma: The Effect of Diet on Blood Sugar in Diabetes Mellitus, Arch. Int. Med., January, 1918, p. 93.
2. Hamman, Louis, and Hirschman, I. I.: Studies on Blood Sugar, Arch. Int. Med., November, 1917, p. 761.

one is supported, so the argument runs, by the existence of a mild hyperglycemia during muscular exercise. Can it be that the rise in blood sugar content in diabetics represents an attempt of the organism to adjust carbohydrate metabolism for the more advantageous utilization of sugar, as seems to happen after exercise? If so, there may be some wisdom in the suggestion of Mosenthal and his associates that we must not counteract the effective use of glucose when the blood sugar is at a higher level. Translated into clinical dietotherapy, it may be desirable not to attempt to reduce the blood sugar to a normal value in every case of diabetes. One sometimes hears a somewhat analogous argument in discussions of fever when the relation of the higher temperature to the febrile process is under debate.

## HIGHER RANKS FOR RESERVE OFFICERS IN THE NATIONAL ARMY

In discussing the Owen-Dyer bill, elsewhere in this issue, we state that the National Defense Act of 1916, creating the Officers Reserve Corps, limits the members of that corps to the grades of lieutenant, captain and major. This, of course, applies to medical officers as well as to others. The Selective Service Law provides officers for the National Army created by that law, by authorizing the President to appoint members of the Officers Reserve Corps, and members of other organizations specified in the law, to positions with the National Army. The officers in rank not above colonel may be appointed by the President alone, and in ranks above colonel by the President by and with the consent of the Senate. This will explain the authority under which certain members of the regular Medical Corps have already been appointed to the rank of brigadier-general, and certain officers of the Medical Reserve Corps have been made lieutenant-colonels. Medical Reserve officers attached to the National Army may, therefore, be given ranks higher than major. The appointments so awarded, however, are temporary—for the period of the emergency—and as we read the law terminate at the end of the war when the National Army is mustered out of service.

## THE PREVENTION OF DEATH

We hasten at the outset to warn any oversanguine reader, if such there be, against unwarranted optimism suggested by this theme. In truth,

> There is no armor against fate;
> Death lays his icy hand on kings;
> Scepter and crown
> Must tumble down,
> And in the dust be equal made
> With the poor crooked scythe and spade.

Nevertheless, a discussion of the cause of death[1] and the formulation that its immediate manifestation is in many instances associated with and presumably attributable to acidosis, whereby the respiratory center is irreparably paralyzed, suggests the possibility of preventive measures. The antidote to an acid is a base. Whitney,[2] to whom we owe the etiologic suggestions just made, has warned, however, against indiscriminate use of alkalis in what one might designate as terminal acidosis. The neutralization of the acid ions, as he quite properly points out, is not the only thing to be considered; the salts thus formed must be eliminated; otherwise they may accumulate to an abnormal and possibly highly dangerous concentration in blood and tissues. If elimination is so poor, Whitney adds, as to allow accumulation of acid, there is every reason to suppose that salts may also be retained. The more rational procedures would be to promote elimination by diuresis as far as possible, and by a gentle breeze of fresh air across the face to prevent even the slightest accumulation of carbon dioxid. But acidosis is not the only foe of man. There are toxins for which no antidote or preventive measures can even be suggested at the present moment.

> Devouring famine, plague, and war,
> Each able to undo mankind,
> Death's servile emissaries are;
> Nor to these alone confined.
> He hath at will
> More quaint and subtle ways to kill.

## CHOLESTEROL AND FAT ABSORPTION

Evidence has been accumulating of late, assigning to the lipoids, lecithin and cholesterol, a rôle in the transport and metabolism of fats.[3] Even in severe lipemia there seems to be a constant relation between the cholesterol, fatty acids and lecithin of the blood, thus attesting the apparently important function of the lipoids maintained under conditions of fat transformations more strenuous than usual. Cholesterol exists in the blood not only in a free state but also in the form of esters. Several investigators have reported a fairly definite relation or balance between the free and the combined cholesterol in the blood. By following the proportions of these lipoid substances in both plasma and corpuscles during the course of the active absorption of fats from the alimentary tract, Knudson[4] of the Albany Medical College has further corroborated much of the evidence already available. He found, as did Bloor,[5] that the total cholesterol of the blood changes very little in amount during uncomplicated fat absorption. But the amount of cholesterol existing as an ester, that is, a compound with one of the higher fatty acid compounds of fat, as exemplified in palmitic, stearic or oleic acid, unquestionably increases under the circumstances. This change seems to go on in the corpuscles. The latter are practically devoid of cholesterol esters under fasting conditions; but, after absorption of fat, increases of several hun-

1. The Cause of Death, editorial, THE JOURNAL A. M. A., Feb. 16, 1918, p. 461.

2. Whitney, J. L.: Studies on Acidosis: The Immediate Cause of Death, and Remarks on the Acidosis of Nephritis, Arch. Int. Med., December, 1917, p. 931.

3. The Lecithins of Milk, editorial, THE JOURNAL A. M. A., Nov. 13, 1915, p. 1734; Pure Lecithin, April 1, 1916, p. 1029; The Assimilation of Fats, July 8, 1916, p. 124; The Lipoids ("Fats") of Human Blood, Sept. 23, 1916, p. 956; Blood Lipoids and Diabetes, Nov. 25, 1916, p. 1602; Biochemical Relationships in Metabolism, Particularly in Respect to Cholesterol, Aug. 11, 1917, p. 474; Cholesterol Estimations in Blood, Dec. 8, 1917, p. 1917.

4. Knudson, A.: Relationship Between Cholesterol and Cholesterol Esters in the Blood During Fat Absorption, Jour. Biol. Chem., 1917, 32, 337.

5. Bloor, W. R.: Jour. Biol. Chem., 1916, 24, 447.

dred per cent. in these esters are regularly found. This is in harmony with the assumption that cholesterol takes an active part in the process. As a somewhat similar increase of fatty acids and of lecithin, noted in the whole blood but particularly in the corpuscles, has also been reported, it would seem that these blood cells must play an active part in the assimilation of fat. It has been suggested that they take up as much fat as possible and transform it into cholesterol esters and the complex fat lecithin, which are regarded as intermediate stages of fat metabolism.

## *Medical Mobilization and the War*

### Personnel of the Medical Department

For the week ending February 15, the personnel of the Medical Department of the Army included:

MEDICAL CORPS: 776 including 1 major-general, 62 colonels, 107 lieutenant-colonels, 213 majors, 2 captains and 391 lieutenants.

MEDICAL RESERVE CORPS: 16,822 including 962 majors, 3,704 captains and 12,156 lieutenants. *On active duty:* 13,507 including 831 majors, 3,128 captains and 9,548 lieutenants.

MEDICAL CORPS, NATIONAL GUARD: 1,201 including 7 lieutenant-colonels, 235 majors, 149 captains and 790 lieutenants.

MEDICAL CORPS, NATIONAL ARMY: 16 including 4 brigadier-generals, 6 colonels, 4 lieutenant-colonels and 2 majors.

The dental corps, 211; dental reserve corps, 4,999, of whom 1,296 are on active duty; dental corps National Guard, 264; veterinary corps, 25; veterinary reserve corps, 1,364, of whom 696 are on active duty; veterinary corps National Guard, 57; veterinary corps National Army, 284; sanitary corps, 811, and ambulance service, 136, constitute the remainder of the commissioned personnel.

### Surgeon-General Braisted Reappointed

Secretary Daniels, announcing that the President has sent to the Senate the reappointment of Rear Admiral William C. Braisted as Surgeon-General of the Navy, states that Surgeon-General Braisted is so efficient and capable, and the Bureau of Medicine and Surgery under his direction has made such an excellent record under the conditions imposed by the war, that his reappointment will meet with general approval. Secretary Daniels also points out the large growth in the personnel of the Navy Medical Department, the attendant increase in equipment, and the fact that the health of the Navy is reported as unusually satisfactory and has shown a marked improvement in the past month. "Surgeon-General Braisted," he says, "keeps in daily touch with sanitary and health conditions ashore and afloat, and the gratifying experience of the Navy as to the health of its personnel is largely due to his foresight and leadership, combined with the complete cooperation of all in the medical corps."

### Medical Officers Wounded

Capt. Robert Drane, M. R. C., Madison, Wis., is reported to have been slightly wounded while serving with the British Army in France, February 5.

Lieut. Willie H. Howell of Belleville, W. Va., attached to a field ambulance, was slightly wounded in action in France, January 30.

Lieut. Herbert A. Brown, M. R. C., Cincinnati, attached to the British Expeditionary Forces, is reported to have been slightly wounded in action, December 31.

Lieut. Wallace A. Belsey, M. R. C., Belvidere, Ill., on duty with the British forces in France is recuperating in a hospital in London from shell wounds received at Cambria, while going over the top to direct stretcher bearers.

### Expansion of Training Camps for Medical Department

According to the *Army and Navy Register*, February 16, Surgeon-General Gorgas has called the attention of the War Department to the fact that the Army Medical Department now lacks quarters at medical training camps for 9,000 men. It has been ascertained that 10,000 men will be assigned to the Medical Department in the second draft, and it is not possible to accommodate more than 2,000 of these at the training camps. Following is the memorandum of Surgeon-General Gorgas:

The present situation is that untrained men have had to be sent direct to hospitals and other organizations not adequately prepared to train them; the past shortages of this department have been added to its present deficiencies, and these, with its prospective needs created by General Pershing's plan, produce a problem in medical training, organization, and preparedness not solvable by present facilities. Every month of delay in satisfying its need has seen its burden grow proportionately heavier.

This department needs, in round numbers, 135,000 men. It takes two months at the very minimum to train a man. All this number should be trained within the next six months to be of any material use in the 1918 drive. Allowing all possible numbers directly absorbable into hospitals and divisions, it is simple mathematics to show that nothing less than all the accommodations at Chickamauga Park, with those now available at the medical officers' training camp, Fort Riley, can even approximate the meeting of required needs.

New camps can not be established at other points for the reason that no instructors, equipment, or material are available. But great expansion of the present nucleus and administrative and teaching staff at the medical officers' training camp, Fort Oglethorpe, is possible and furnishes the only solution.

In a letter from this office of January 16 request is made that the War Department formulate a definite policy under which the medical department shall systematically receive personnel, with approximate dates and numbers of instalments.

The present letter further requests the formulation of a policy by which this department may be enabled to shelter, organize, and train such personnel as higher authority may decide as necessary to it.

### Surgeon-General Inspects Camp Greene, N. C.

Under date of February 12 Surgeon-General Gorgas sent the following memorandum to the secretary of war relative to conditions at Camp Greene, N. C.:

The wet weather and character of the soil at Camp Greene, Charlotte, N. C., together with the temporary nature of the camp, have brought about conditions which I wish to call to your attention and which may be summarized as follows from the last two reports of sanitary inspections of the camp:

GARBAGE REMOVAL STOPPED BY MUD

Knee-deep mud has interfered with garbage removal by contractors, and quantities have been dumped or buried because of shortage of fuel for burning it.

Limited facilities for heating water for bathing over a period of several months has resulted in the men becoming dirty.

Water from the kitchens, baths and overflowed latrines is removed by ditches, surface drainage, or stands in pools. The character of the soil will make it slow to dry out and, with the advent of warm weather, flies and other insanitary conditions may be anticipated.

The dirt floors of the kitchens will breed flies; the field ranges in use are uneconomical and smoke indoors with any wood fuel.

Shortage of supplies has held back the work on the detention camp for contacts until its overcrowded condition has led to the establishment of quarantine areas in the regiments, but reports on this indicate that completion of the detention camp is preferable to continuation of the latter plan, especially since sufficient tent space and separate latrines and mess halls have not been available to make the regimental quarantine absolute in the areas set aside.

Work has been held up on the additional quarters for nurses by failure of material to arrive, and the same has affected progress on reconstruction of the operating and laboratory buildings of the base hospital, which were recently destroyed by fire.

Overcrowding, to the extent of eight men to a tent, and occasionally more, is reported.

Sick rates at Camp Greene are not notably high and measles and pneumonia cases appeared on the decline at the last report, but the insanitary conditions mentioned should be corrected without delay to prevent increased sickness and mortality, which may result from their continuance.

It has been recommended that additional tentage be supplied the commanding general at Camp Greene to enable him to quarter all men on the basis of five to a tent instead of eight. It is understood that this recommendation has been approved.

The immediate necessity at Camp Greene is the installation of a sewer system for the entire camp, which is again urgently recommended.

## NEWS OF THE CANTONMENTS

**Eighty-Fourth Division, Camp Zachary Taylor, Louisville, Ky.**

Feb. 11, 1918.

### INCREASE IN PATIENTS' RATIONS

An increase will be made in the rations for nurses and patients at the base hospital at Camp Zachary Taylor. The ration allowance of 40 cents a day for each nurse and patient will be increased to 60 cents a day. This will make possible the serving of any special diet prescribed by the medical officers for the patients. This increase in ration allowance has been made necessary by the increase in the cost of necessities.

### COURTS MARTIAL

Brigadier-General Wilder has issued a memorandum that there have been too many courts martial held at the camp. He states that in many of these cases the offenses could have been settled by the company commander by company punishment. Instead, the officer has preferred charges against the soldier, with the result that he has gone before a court martial. At a court martial all witnesses must be heard, even though the soldier pleads guilty.

According to the review of a court martial verdict in the case of an officer tried for drunkenness by the commanding general, drunkenness in the Army, especially in the case of an officer, is so utterly reprehensible and disgraceful that its toleration by military courts or other military authorities can serve only to bring reproach on the service and, if unchecked, disaster to our arms.

### TREATMENT OF SOLDIERS' FAMILIES

Special arrangements to provide medical services for the 400 families of soldiers in Louisville have been made by the U. S. Government.

An office has been opened in the custom house. First Lieut. Charles B. Matthews, M. R. C., formerly of Lexington, Ind., will be in charge, assisted by Lieut. W. K. Main, both being from the One Hundred and Fifty-Ninth Depot Brigade. A full equipment of medicines and instruments will shortly be installed, and all medicines and treatments will be free to the wives and children of soldiers. Calls will be made at the homes of patients by the surgeons in charge. Authorization for the new office was received from Washington, January 26, Col. John H. Allen, division surgeon, being responsible for the office.

### ARMY NURSES

Five Army reserve corps nurses who have been on duty at Camp Zachary Taylor have been ordered to a port of embarkation for duty in France. Miss Mabel Peters, a graduate of the Louisville City Hospital, is the nurse in charge of the party. They will report to the commanding officer of Hospital Unit D, Major Irvin Lindenberger. Physicians and enlisted men of the unit have been stationed at Fort McPherson, Ga., near Atlanta, and will join the nurses at their point of embarkation in the East.

### FOOD WASTE

A visit to the dining room of the base hospital, where the convalescent patients are fed, is a revelation. Before they begin to eat, Captain Dennen in an impressive short address, tells them the importance of not taking more food on their plates than they can eat. The Army wants the men to have all they want, but they are expected to eat all they take on their plates. Each man stands at attention after the meal is finished until the plates have been inspected. One hundred and seventy-five men were fed, and there was not a pint of refuse left on the plates—no scraps of bread, and only the inedible parts of the meat served. Unconsumed food remained in the dishes, and was taken back to the kitchen to be served again.

### LETTER WRITING

Soldiers are great letter writers, the report from the Y. M. C. A. showing that from the various buildings 147,872 letters were mailed in January, making an average of seven letters to each man.

Money orders totaled $27,567.67, which were sold to soldiers.

### PERSONAL

Lieut.-Col. John H. Allen was confined to his home in Walden Place for several days with an attack of tonsillitis. ——The superintendent of the city hospital, Dr. Tuley, after a visit to the base hospital convalescent dining room at Camp Zachary Taylor, made a request of the commanding general of the Eighty-Fourth Division for Captain Dennen, M. R. C., to address the patients, the maids, the help, the nurses and the staff on the importance of food conservation. This he did on Tuesday of this week, with a decided reduction in the amount of garbage sent out from the hospital.

## DISEASE CONDITIONS AMONG TROOPS IN THE UNITED STATES

**Extracts from Telegraphic Reports Received in the Office of the Surgeon-General for the Week Ending Feb. 8, 1918**

1. ANNUAL ADMISSION RATE PER 1,000 (disease only):
   - All Troops ..... 1,662.2
   - National Guard Camps ..... 1,488.7
   - National Army Camps ..... 2,003.7
   - Regular Army ..... 1,295.3
2. NONEFFECTIVE RATE PER 1,000 ON DAY OF REPORT:
   - All Troops ..... 51.4
   - National Guard Camps ..... 48.5
   - National Army Camps ..... 59.5
   - Regular Army ..... 40.2
3. CAMPS HAVING ADMISSION RATE FOR DISEASE HIGHER THAN AVERAGE: National Guard: Camps Bowie, Wheeler, Doniphan, Sevier, Kearny and Beauregard. NATIONAL ARMY: Camps Travis, Pike, Funston (89th), Lee, Funston (92nd), Dodge, Jackson, Zachary Taylor and Sherman. REGULAR ARMY: Central and Southern Departments.
4. CAMPS HAVING NONEFFECTIVE RATE HIGHER THAN AVERAGE: NATIONAL GUARD: Camps Bowie, Beauregard, Wheeler, Shelby, Sevier and Kearny. NATIONAL ARMY: Camps Travis, Pike, Funston (92nd), Funston (89th), Zachary Taylor, Jackson, Dodge and Lee. REGULAR ARMY: Southeastern, Central and Southern Departments.
5. VENEREAL DISEASES: Annual admission rate per 1,000:
   - National Guard Camps ..... 65.6
   - National Army Camps ..... 84.4
   - Regular Army ..... 60.8

   CAMPS HAVING RATE ABOVE AVERAGE: NATIONAL GUARD: Camps Bowie, Logan, Wheeler, Cody and Beauregard. NATIONAL ARMY: Camps Pike, Dix, Jackson, Zachary Taylor, Lewis and Lee. REGULAR ARMY: Northeastern, Central and Southern Departments.
6. Number of new cases of Pneumonia reported ..... 792
   - Highest number in any one camp (Bowie) ..... 123

   Number of new cases of Meningitis reported ..... 117
   - Highest number in any one camp (Jackson-6; Beauregard-6).. 6

**NEW CASES OF SPECIAL DISEASES REPORTED DURING THE WEEK ENDING FEB. 8, 1918**

| Division | Pneumonia | Dysentery | Malaria | Venereal | Paratyphoid | Typhoid | Measles | Meningitis | Scarlet fever | Deaths | Noneffective per 1000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Wadsworth | 5 | ... | ... | 20 | .. | .. | ... | .. | .. | 0 | 28.9 |
| Hancock | 11 | ... | ... | 19 | .. | .. | 11 | 3 | 3 | 3 | 38.4 |
| McClellan | 10 | ... | ... | 25 | .. | .. | 22 | .. | 3 | 1 | 39.0 |
| Sevier | 17 | ... | ... | 28 | .. | .. | 39 | 2 | .. | 4 | 58.5 |
| Wheeler | 29 | ... | 1 | 50 | .. | .. | ... | 1 | .. | 3 | 70.1 |
| Logan | 17 | ... | ... | 83 | .. | .. | 57 | .. | 1 | 4 | 34.7 |
| Cody | 75 | ... | ... | 40 | .. | .. | 11 | 2 | .. | 10 | 45.0 |
| Doniphan | 22 | ... | ... | 14 | .. | .. | 4 | 3 | .. | 1 | 42.2 |
| Bowie | 123 | ... | ... | 75 | .. | .. | 6 | 2 | .. | 2 | 84.0 |
| Sheridan | 16 | ... | ... | 7 | .. | .. | 14 | .. | 1 | 7 | 37.4 |
| Shelby | 12 | ... | 1 | 31 | .. | .. | ... | 4 | 1 | 2 | 60.5 |
| Beauregard | 13 | ... | 7 | 19 | .. | .. | ... | 6 | .. | 3 | 70.7 |
| Kearny | 13 | ... | ... | 2 | .. | .. | 3 | 1 | 14 | 3 | 54.2 |
| Devens | 7 | ... | ... | 15 | .. | .. | 28 | 1 | .. | 2 | 37.2 |
| Upton | 15 | ... | ... | 27 | .. | .. | ... | 1 | 5 | 2 | 32.7 |
| Dix | ... | ... | ... | 60 | .. | .. | 57 | 1 | 7 | 3 | 49.6 |
| Meade | 11 | ... | ... | 18 | .. | .. | 20 | 4 | 12 | 10 | 34.3 |
| Lee | 15 | ... | 1 | 48 | .. | .. | 47 | 3 | .. | 9 | 70.0 |
| Jackson | 13 | ... | ... | 41 | .. | .. | 10 | 6 | .. | 3 | 80.7 |
| Gordon | 9 | ... | ... | 31 | .. | .. | 20 | 1 | .. | 6 | 38.7 |
| Sherman | 2 | ... | ... | 41 | .. | .. | 44 | 3 | 18 | 2 | 47.2 |
| Taylor | 27 | ... | ... | 48 | .. | .. | 12 | .. | 2 | 4 | 83.4 |
| Custer | 4 | ... | ... | 20 | .. | .. | 22 | .. | 5 | 7 | 46.9 |
| Grant | 3 | ... | ... | 27 | .. | .. | 46 | 1 | 10 | 3 | 39.4 |
| Pike | 19 | ... | 8 | 219 | .. | .. | 17 | 1 | 19 | 20 | 58.1 |
| Dodge | 13 | ... | ... | 13 | .. | .. | 27 | 2 | 10 | 5 | 78.7 |
| Funston, 89th | 11 | ... | ... | 19 | .. | .. | 4 | 3 | 1 | 6 | 58.5 |
| Travis | 54 | ... | ... | 18 | .. | .. | 7 | 4 | .. | 12 | 100.5 |
| Lewis | 6 | ... | ... | 61 | .. | .. | 30 | 2 | 65 | 0 | 32.2 |
| Funston, 92d | 2 | ... | ... | ... | .. | .. | 1 | .. | .. | 0 | 90.3 |
| Regulars | 190 | 5 | 7 | 402 | .. | .. | 386 | 30 | 125 | 67 | 40.2 |
| National Guard in Departments | ... | ... | ... | 11 | .. | .. | 20 | .. | 2 | 2 | 28.7 |
| National Army in Departments | 12 | ... | ... | 40 | .. | .. | 107 | .. | 30 | 6 | 112.0 |

ANNUAL RATE PER 1,000 FOR SPECIAL DISEASES

| | Regulars, U. S. Army, in U. S. only, 1916* | Regulars in U. S., Week Ending Feb. 8, 1919 | National Guard, All Camps, Week Ending Feb. 8, 1918 | National Army, All Camps, Week Ending Feb. 8, 1918 | American Expeditionary Forces, Week Ending Feb. 8, 1918 |
|---|---|---|---|---|---|
| Pneumonia | 2.59 | 30.1 | 58.3 | 28.4 | 28.5 |
| Dysentery | 3.97 | 0.7 | 0.0 | 0.0 | 0.7 |
| Malaria | 11.37 | 1.0 | 1.4 | 0.5 | 1.2 |
| Venereal | 91.23 | 60.8 | 65.6 | 84.4 | 57.9 |
| Paratyphoid | 0.31 | 0.0 | 0.0 | 0.0 | 0.0 |
| Typhoid | 0.21 | 0.0 | 0.0 | 0.0 | 0.2 |
| Measles | 20.79 | 85.6 | 21.5 | 50.7 | 25.0 |
| Meningitis | 0.29 | 4.5 | 2.7 | 4.0 | 1.6 |
| Scarlet fever | 0.79 | 18.9 | 8.5 | 18.4 | 13.4 |

* Enlisted men only, both white and colored.

## CORRECTION

Under "Orders to Officers of the Medical Reserve Corps," in the issue of February 2, appeared the following order: *"To his home* and to the inactive list, Major ALBERT J. OCHSNER, Chicago; on account of being physically disqualified for active service, Capt. FRANCIS M. EDWARDS, Centralia." This should be understood as two orders, namely: *To his home* and to the inactive list, Major ALBERT J. OCHSNER, Chicago; and *to his home* and to the inactive list on account of being physically disqualified for active service, Capt. FRANCIS M. EDWARDS, Centralia.

## ORDERS TO OFFICERS OF THE MEDICAL CORPS

*To Hoboken, N. J.*, for duty and on completion *to his proper station*, Col. ELBERT E. PERSONS.

*To New Haven, Conn.*, for inspection and on completion *to his proper station*, Col. GEORGE H. BUSHNELL.

*To report to the Surgeon-General* for duty in his office, Col. JAMES R. CHURCH.

*To Camp Greene*, Charlotte, N. C., for inspection and on completion *to his proper station*, Lieut.-Col. CHARLES F. MORSE. For temporary duty, from Camp McClellan, Major CONDON C. McCORNACK. As orthopedic surgeon, from Camp Meade, Lieut. HAROLD D. ROGERS.

*To Lake City, Fla.*, for inspection and on completion *to his proper station*, from Camp Joseph E. Johnston, Lieut.-Col. JOSEPH Y. PORTER.

*To Washington, D. C.*, as medical member of examining boards and assistant recruiting officer, Aviation Section, Signal Corps, Lieut.-Col. SAMUEL M. DE LOFFRE.

*To Fort Monroe, Va., and Salisbury, N. C.*, for inspection and on completion *to his proper station*, Senior Surgeon JOSEPH H. WHITE.

*To Camp MacArthur*, Waco, Texas, for temporary duty, from Camp Logan, Major SAMUEL S. CREIGHTON.

*To Muncie, Ind.*, for inspection and on completion *to his proper station*, Major JOHN R. McKNIGHT.

*To San Francisco, Calif.*, for treatment, from Camp Lewis, Major EUGENE G. NORTHINGTON. For duty, from Philippine Department, Lieut. HERMAN G. MAUL.

*To West Point, N. Y.*, U. S. Military Academy, for duty, from Fort Oglethorpe, Major HOWARD H. BAILY.

*To Camp Hancock*, Augusta, Ga., for temporary duty, Capt. THEODORE C. FEGLEY.

*To Camp Sevier*, Greenville, S. C., as orthopedic surgeon, from Camp Meade, Lieut. HASKETT L. CONNER.

*To Camp Upton*, Long Island, N. Y., as orthopedic surgeon, from Camp Lee, Lieut. HARVEY E. WEBB.

*To Camp Wadsworth*, Spartanburg, S. C., for duty, Lieut. JOSEPH H. MURPHY.

*To Douglas, Ariz.*, for duty, from Fort Riley, Lieut. JAMES McALLISTER.

*To Fort Totten, N. Y.*, for duty, from Fort Totten, Lieut. SETH H. MILES.

*To Kelly Field*, San Antonio, Texas, with the neuropsychiatric board to examine the command in his specialty, Lieut. GORDON F. WILLEY.

*Resignation* from Medical Corps, National Guard, accepted, Lieuts. GEORGE F. HOLLAR, GEORGE C. WILLIAMSON.

*Honorably discharged* from the Medical Corps, National Guard, Capt. CHARLES M. SEIVERS; Lieuts. FORD A. BARNES, ROBERT L. BARROW, LOUIS P. LANE, Jr. On account of physical disability incident to service and incurred in line of duty, Lieut. ISAAC G. COOK.

## ORDERS TO OFFICERS OF THE MEDICAL RESERVE CORPS

### Alabama

*To Fort Bayard*, New Mexico, for duty, from Camp Jackson, Lieut. OTIS W. LITTLE, Mount Vernon.

*To Fort Monroe, Va.*, for duty, from Fort Oglethorpe, Lieut. LEON C. ELLIS, Florence.

*To Fort Oglethorpe for instruction*, Capt. THOMAS H. STREET, Alexander City; Lieuts. JOHN T. CALLAWAY, ROBERT G. LOVELADY, Birmingham; JAMES F. BEAN, Brundidge; WILLIAM S. McELRATH, Cedar Bluff; JAMES O. MORGAN, Piedmont. For duty, HENRY C. HARRIS, Birmingham.

*To Mercedes, Texas*, for duty, from Fort Oglethorpe, KOSSUTH R. CAMMACK, Evergreen.

*To their homes* and honorably discharged from the M. R. C., Lieut. RAYFORD A. SMITH, Franklin. On account of physical disability existing prior to entrance into the service, Lieut. JAMES L. NORTHINGTON, Hamilton.

### Arizona

*To San Antonio, Texas*, Kelly Field, Aviation Camp, as member of tuberculosis board, Lieut. SPENCER D. WHITING, Phoenix.

### Arkansas

*To Camp Devens*, Ayer, Mass., for duty, from Fort Oglethorpe, Lieut. MAC McLENDON, Marianna.

*To Fort McPherson, Ga.*, for duty, Lieut. EDWARD O. DAY, Little Rock.

*To Fort Oglethorpe* for instruction, Capt. ELFRED G. HEARN, Arkadelphia.

*To Lonoke, Ark.*, Eberts Field, Signal Corps, Aviation School for duty, JOSEPH S. DAVIDSON, Marvell.

*To their homes* and honorably discharged, Lieut. WILLIAM B. CENTER, Garland. On account of physical disability which existed prior to his entrance into the service, Lieut. GROVER C. BRUCE, Dalark.

### California

*To Alcatraz*, California, for duty, from San Francisco, Capt. FREDERICK E. ALLEN, San Francisco.

*To Army Medical School* for orthopedic instruction, Capt. ERNEST W. CLEARY, San Francisco.

*To Camp Kearny*, Linda Vista, for duty, Capt. JOHN A. BALSLEY, San Monica; Lieuts. LOWELL C. FROST, Beverly Hills; FRED C. SHURTLEFF, Los Angeles.

*To Fort McHenry, Md.*, for duty, from Camp Sevier, Capt. HOWARD C. NAFFZIGER, San Francisco.

*To Fort Riley* for instruction, Lieuts. FREDERIC B. WEST, Los Angeles; BYRON Y. MILLER, San Luis Obispo.

*To Mineola*, Long Island, N. Y., Hazelhurst Field, for duty in connection with the Medical Research Board, from Washington, D. C., Capt. JAMES L. WHITNEY, Sausalito.

*To New York City*, Cornell Medical College, for instruction in military roentgenology, then *to Hoboken, N. J.*, for duty, from Fort Mason, Capt. HOWARD E. RUGGLES, San Francisco. *Neurological Institute*, for instruction, from Camp Kearny, Capt. BYRON P. STOCKEY, Lieut. CARL W. RAND, Los Angeles.

*To report to the Commanding General*, Western Department, for assignment to duty, from duty as a drafted man at Fort Riley, Lieut. HARRY S. HOLMES, San Francisco.

*To San Antonio, Texas*, Kelly Field, as orthopedic surgeon, from Camp Stanley, Capt. JOHN M. HENCH, Pacific Grove.

*To San Francisco*, Letterman General Hospital, as orthopedic surgeon, Capt. EARL N. GREENWOOD, San Francisco. For duty, Capt. LAWRENCE H. HOFFMAN, San Francisco; Lieut. WILLIAM L. ADAMS, Fresno; from Camp Kearny, Capt. HARRY E. FOSTER, Berkeley; Lieuts. ROBERT B. HILL, Los Angeles; JAMES R. SNYDER, Sacramento.

*To St. Louis, Mo.*, Washington University Medical School for instruction, from Fort Riley, Lieut. GEORGE W. PURCELL, San Francisco.

*To Western Department* for assignment to duty, Lieuts. PAUL DeW. BARNES, Berkeley; LEO D. SCOTT, Long Beach; OLIVER W. BUTLER, Los Angeles; MELVIN A. SHADE, Oakland.

*To his home* and honorably discharged from the M. R. C. on account of physical disability which existed prior to his entrance into the service, Capt. LEONARD W. ATKINSON, Napa.

*Honorably discharged*, Lieut. CLYDE B. LAUGHLIN, Bay Point. On account of physical disability existing prior to entrance into the service, Lieut. BURRELL O. RAULSTON, Los Angeles.

### Colorado

*To Camp Dodge*, Des Moines, Iowa, for duty, from Camp Dodge, Capt. AMOS L. BEAGHLER, Denver.

*To Denver* as assistant recruiting officer, in addition to his present duties at that place, Capt. CUTHBERT POWELL, Denver.

*To Fort Riley* for instruction, Lieut. ALBERT W. DEWEY, Denver.

*To New Haven, Conn.*, to inspect a tuberculosis hospital and on completion *to his proper station*, Capt. ALEXIUS M. FORSTER, Colorado Springs.

*To New York City*, Neurological Institute, for instruction, from Camp Bowie, Capt. LEWIS H. McKINNIE, Colorado Springs.

*To Williamsbridge, N. Y.*, as tuberculosis instructor, from Army Medical School, Major GERALD B. WEBB, Colorado Springs.

### Connecticut

*To Fort Oglethorpe* for instruction, Lieut. ROBERT E. CONWAY, Hartford; from duty as a private at Camp Devens, Lieut. JAMES P. McMANUS, New Haven.

*To New Haven, Conn.*, as medical member of examining board and recruiting officer, Aviation Section, Signal Corps, from Mineola, Lieut. EUGENE M. BLAKE, New Haven.

*To his home* and honorably discharged on account of physical disability which existed prior to his entrance into service, Lieut. EDWARD A. WILLIAMSON, Stamford.

### District of Columbia

*To Fort McHenry, Md.*, for duty, from Allentown, Pa., Capt. CARLTON D. HAAS, Washington.

*To Minola*, Long Island, N. Y., Hazelhurst Field, for duty in connection with the Medical Research Board, from Washington, D. C., Majors EDWARD G. SEIBERT, WILLIAM H. WILMER, Washington.

*To report in person* to the Surgeon-General of the Army for duty in his office, Capt. WILBUR A. SAWYER, Washington.

*To Rochester, Minn.*, Mayo Clinic, for instruction and on completion *to Camp Dodge*, for duty, from Fort Oglethorpe, Lieut. L. BRUCE KLINE, Washington.

*To Walter Reed General Hospital*, Takoma Park, D. C., from New York City, Lieut. STUART C. JOHNSON, Washington.

### Florida

*To Camp Joseph E. Johnston*, Jacksonville, Base Hospital, Lieut. ARTHUR W. ERKFITS, St. Petersburg. For duty, from Fort Oglethorpe, Lieut. ALBERT H. WILKINSON, Jacksonville.

*To Camp Upton*, Long Island, N. Y., for duty, from Fort Oglethorpe, Lieut. GROVER C. HARDIE, Fort Pierre.

*To Fort Oglethorpe* for instruction, from Camp Lee, Lieut. JULIAN E. GAMMON, Jacksonville.

*To his home* and honorably discharged, Lieut. JOHN D. ADAMS, Milligan.

### Georgia

*To Camp Devens*, Ayer, Mass., for duty, from Fort Oglethorpe, Lieuts. MOSES B. COPELOFF, Atlanta; DENNIS F. WELDON, Danielsville.

*To Camp Dodge*, Des Moines, Iowa, for duty, Lieuts. WILLIAM M. TAPPAN, Augusta; CLAUDE A. ALMOND, Lithonia.

*To Camp Joseph E. Johnston*, Jacksonville, Fla., Base Hospital, Lieuts. EDWARD KING, GEORGE H. NOBLE, Jr., Atlanta; SAM M. NOWELL, Carterville; KINSEY E. FOSTER, College Park; PAUL H. CHRISTIAN, F. L. COSBY, Jr., JOHN B. VERNER, Jr., Columbus; DAVID H. GARRISON, Cornelia; WARREN L. HALL, Nicholls; WILLIAM A. DEAN, Rome; MYLES B. SHARKEY, Waycross; LEON E. BRAWNER, Whigham.

*To Camp Shelby*, Hattiesburg, Miss., for duty, from Fort Oglethorpe, Lieuts. CLEVELAND W. FINDLEY, Broxton; HENRY P. LYON, Mystic; ISAAC J. PARKERSON, Eastman.

*To Fort Hancock, N. J.*, for duty, from Fort Oglethorpe, Lieut. MINTON C. McAFEE, Macon.

*To Fort Oglethorpe* for instruction, from Camp Gordon, Capt. WALPOLE C. BREWER, Atlanta. For instruction and on completion *to Camp Cody* for duty, Capt. ROBERT C. EVE, Augusta. For instruction, Capt. JOHN W. DANIEL, Savannah; Lieuts. CHESTER O. MIDDLEBROOKS, Bogart; HORACE F. STILTNER, Chickamauga; WILBUR N. SCOTT, Devereux; WARREN M. ROYAL, Fitzgerald; from Fort McPherson, Lieut. GROVER C. GAMBRELL, Rutledge.

*To New York City*, Neurological Institute, for instruction, from Camp Wadsworth, Capt. WELDON E. PERSON, Atlanta.

*To Rockefeller Institute* for instruction in the serum therapy of pneumonia, Lieut. CHARLES C. HINTON, Macon.

*To their homes* and honorably discharged, Lieuts. DENNIS F. WELDON, Danielsville; WILLIAM E. POWELL, Lumber City; HUGH K. PHILLIPS, Santee. On account of physical disability which existed prior to entrance into service, JAMES R. SMITH, Atlanta; ELISHA F. BOMAR, Lyons.

### Idaho

*To Fort Riley* for instruction, Lieuts. MAURICE H. TALLMAN, Boise; DUNCAN L. ALEXANDER, Twin Falls.

### Illinois

*To Chicago, Ill.*, for instruction, Lieut. DANIEL H. LEVINTHAL, Chicago.

*To Camp Beauregard*, Alexandria, La., and *Camp Sheridan*, Montgomery, Ala., for duty, and on completion *to his proper station*, Major JOHN A. HORNSBY, Chicago.

*To Camp Devens*, Ayer, Mass., for duty, from Fort Oglethorpe, Lieut. SAMUEL L. OREN, Lewistown.

*To Camp Lee*, Petersburg, Va., for duty, from Camp Lee, Capt. WILLIAM T. WILLIAMSON, Lexington.

*To Camp Logan*, Houston, Texas, for duty, from Camp Doniphan, Capt. CHARLES H. PARKES, Chicago.

*To Camp Pike*, Little Rock, Ark., for duty, from Fort Oglethorpe, Lieut. ROBERT H. HENDERSON, Chicago.

*To Camp Shelby*, Hattiesburg, Miss., for duty, from Fort Oglethorpe, Lieut. ARVID E. KOHLER, Moline.

*To Camp Travis*, Fort Sam Houston, Texas, for temporary duty, Lieut. EUGENE S. TALBOT, Jr., Chicago; from Fort Riley, Lieuts. GILBERT E. BRERETON, CLIFFORD W. WELLS, Chicago.

*To Cleveland, Ohio*, for instruction and on completion *to Camp Custer* for duty, from Camp Sherman, Major JOSEPH R. HOLLOWBUSH, Rock Island.

*To Fort Hancock, N. J.*, for duty, from Fort Oglethorpe, Lieut. FRANK E. NAGEL, Secor.

*To Fort Leavenworth, Kan.*, Department Laboratory, from Fort Riley, Lieuts. EARL W. GILROY, Chicago; HARRY A. MYERS, Joliet.

*To Fort Monroe, Va.*, for duty, from New York City, Lieut. GUY M. McLEAN, Chicago.

*To Fort Oglethorpe* for instruction, from Camp Hancock, Major JOHN W. TURNER, Chicago; from Camp Gordon, Capt. JAMES A. BRITTON, Chicago; from Camp Lee, Capt. WILLIAM T. WILLIAMSON, Lexington; from Fort McPherson, Capt. WILLIAM W. HOYT, Chicago. For instruction, Capts. OSMAN A. COSS, Saunemin; WALTER WALDEN, Watertown; Lieuts. ALEXANDER B. McNABB, JOHN GABRIEL O'MALLEY, Chicago.

*To Fort Riley* as instructor, from Camp Doniphan, Major SIDNEY STRAUSS, Chicago. For instruction, Capts. GRANT B. BUSHEE, Arlington; IRWIN S. KOLL, Chicago; Lieut. CARL H. DAVIS, Chicago.

*To Fort Slocum*, Mineola, L. I., *Fort Wood, N. Y.*, and *Hoboken, N. J.*, for temporary duty, and on completion *to his proper station*, Lieut. WILLIAM W. GAILEY, Bloomington.

*To Garden City, Long Island, N. Y.*, Aviation General Supply Depot, for duty, Lieut. DANIEL F. HAYES, Chicago.

*To Governor of Illinois* as medical advisor, Major JOHN W. DODSON, Chicago.

*To Newport News, Va.*, for duty, Major FRANK S. CHURCHILL, Chicago.

*To Rochester, Minn.*, Mayo Clinic, for instruction, and on completion *to Camp Beauregard*, Lieut. JOHN V. VAN PAING, Chicago; on completion *to Camp Devens*, from Fort Oglethorpe, Lieut. JOHN G. FROST, Chicago; on completion *to Camp Grant*, Lieut. THOMAS A. CARTER, Chicago.

*To Rockefeller Institute* for instruction and on completion *to Camp Pike*, for temporary duty, from New York, Major WILLIAM FULLER, Chicago.

*To Walter Reed General Hospital*, Takoma Park, D. C., from New York, Capt. BERNARD M. CONLEY, Wilmette.

*To his home* and honorably discharged, from Camp Grant, Capt. JAMES R. TWEEDY, Cobden. *To their homes* and honorably discharged, Lieuts. CHARLES B. GIBSON, Chicago. On account of physical disability which existed prior to entrance into the service, IMAS P. RICE, Oak Park; ROBERT H. JACOBS, Quincy.

### Indiana

*To Camp Logan*, Houston, Texas, for duty, from Fort Riley, Lieut. THEOPHILUS P. CAPLINGER, Wallace.

*To Camp Pike*, Little Rock, Ark., for duty, Lieut. CHARLES G. BEALL, Fort Wayne.

*To Camp Travis*, Fort Sam Houston, Texas, for duty, Lieut. HARRY L. COOPER, South Bend.

*To Fort Oglethorpe* for instruction, Capt. THOMAS J. DEHEY, South Bend.

*To Newport News, Va.*, for duty, from Camp Devens, Lieut. ASHTON M. BALDWIN, Marion.

*To Rochester, Minn.*, Mayo Clinic, for instruction and on completion *to Camp Grant*, Rockford, Ill., for duty, from Chickamauga Park, Capt. CLAUDE DuV. HOLMES, Indianapolis.

### Iowa

*To Camp Dodge*, Des Moines, Iowa, for duty, Lieut. FLOYD H. WEIDLEIN, Wellman.

*To Camp Grant*, Rockford, Ill., for duty, from Fort Riley, Capt. JAMES J. DALY, Decorah.

*To Camp Jackson*, Columbia, S. C., as divisional psychiatrist, from Camp Doniphan, Capt. THOMAS J. HELDT, Cedar Falls.

*To Camp Wheeler*, Macon, Ga., for duty, from Camp Dix, Lieut. JOHN D. HEXOM, Decorah.

*To Fort McHenry, Md.*, for duty, from Fort Riley, Major CHARLES E. RUTH, Des Moines.

*To Fort Moultrie, S. C.*, for temporary duty, from Fort Moultrie, Lieut. ARTHUR C. STRONG, Burlington.

*To Fort Oglethorpe* for instruction, Lieuts. WALTER E. FOLEY, Davenport; ROSWELL H. PAYNE, Des Moines.

*To Fort Riley* for instruction, Capts. HUGH MULLARKY, Manson; DYRE H. PELLETIER, New Hartford.

### Kansas

*To Camp Jackson*, Columbia, S. C., for temporary duty, Lieut. ROBERT C. DAVIS, Kansas City.

*To Fort Riley* for instruction, Lieuts. JAMES H. BRYANT, Garden City; FRANCIS B. SHELDON, McDonald.

*To his home* and honorably discharged, Lieut. MEADE A. BUTTON, Topeka.

### Kentucky

*To Camp Devens*, Ayer, Mass., for duty, from Fort Oglethorpe, Lieut. HOMER A. SUTTER, Newport.

*To Camp Meade*, Annapolis Junction, Md., cardiovascular board, to examine the troops in his specialty, from Camp Meade, Lieut. THOMAS F. MILLER, Glasgow.

*To Camp Shelby*, Hattiesburg, Miss., for duty, from Fort Oglethorpe, Lieut. EARL M. CULTER, Covington.

*To Fort Oglethorpe* for instruction, from Camp Gordon, Capt. HORACE LUTEN, Fulton; from Camp Taylor, Lieut. EDWIN W. MONTGOMERY, Vine Grove. For instruction, Lieuts. JOSEPH A. SLEET, Frankfort; RANDOLPH DADE, Hopkinsville.

*To Fort Thomas, Ky.*, for duty, from Cincinnati, Capt. JOHN B. ROBARDS, Harrodsburg; from Camp Custer, Lieut. THEODORE SALLEE, Covington.

*To Minola*, Long Island, New York, Hazelhurst Field, for duty in connection with the Medical Research Board, from Washington, D. C., Capt. SAMUEL S. SMITH, Greenup.

*To Rockefeller Institute* for instruction and on completion *to Camp Bowie*, Fort Worth, Texas, for duty, Major IRVIN ABELL, Louisville.

*To St. Louis, Mo.*, Washington University, for instruction in urology and dermatology, from Camp Shelby, Capt. JETHRA HANCOCK, Louisville.

*To Washington, D. C.*, Washington Barracks, for duty, from Fort Oglethorpe, Lieut. HUNTER W. GINGLES, Kirksey.

*To their homes* and honorably discharged, Lieuts. LITTLETON O. KEEN, Burkesville; HUNTER W. GINGLES, Kirksey; EDWARD L. IRWIN, Louisville; GIDEON W. STONE, Middlesboro.

### Louisiana

*To Army Medical School*, Washington, D. C., for instruction, Lieut. ABRAHAM MATTES, New Orleans.

*To Baton Rouge* to examine applicants for the Officers' Reserve Corps, Capt. CHARLES McVEA, Baton Rouge.

*To Camp Beauregard*, Alexandria, for duty, Capt. ABRAHAM J. LEVIN, New Orleans.

*To Camp Travis*, Fort Sam Houston, Texas, for duty, from Camp Beauregard, Lieut. DAVID B. DAVIS, Bunkie.

*To Fort Oglethorpe*, for instruction, Lieuts. WILLIAM L. STONE, Homer; EMILE F. NAEF, New Orleans; WILEY H. BILLINGSLEY, Shreveport.

### Maine

*To Camp Jackson*, Columbia, S. C., for temporary duty, Lieut. STEPHEN A. COBB, Sanford.

*To Camp Lee*, Petersburg, Virginia, for temporary duty, Capt. ALFRED MITCHELL, Portland.

*To Fort Oglethorpe*, for instruction, Lieut. JOHN L. PEPPER, Madison.

### Maryland

*To Camp Dix*, Wrightstown, N. J., for temporary duty, from Fort Myer, Capt. ALEXANDER D. McCONACHIE, Baltimore.

*To Baltimore, Md.*, for temporary duty, and on completion *to his proper station*, Major JAMES BERDLEY, Baltimore.

*To Fort Oglethorpe*, for instruction, from Camp Gordon, Capt. ALGERNON D. ATKINSON; from Camp Hancock, Capt. ISIDORE ISAAC HIRSCHMAN, Baltimore. For instruction, Lieut. MARCUS D. SMITH, Cambridge.

*To New York City*, Neurological Institute, for intensive training, Lieut. PHILLIP PEARLSTEIN, Baltimore.

*To Philadelphia, Pa.*, and *New York City*, to inspect the Neuro-surgical Schools at these places, and on completion *to his proper station*, Major CHARLES BAGLEY, Jr., Baltimore.

*To Rockefeller Institute* for instruction and on completion *to Camp Shelby*, for temporary duty, from Neurological Institute, New York, Lieut. GEORGE W. BISHOP, Govans.

### Massachusetts

*To Albany, N. Y.*, for duty, from Neurological Institute, New York City, Lieut. HENRY VIETS, Boston.

*To Army Medical School*, Washington, D. C., for orthopedic instruction, and on completion *to his proper station*, from Boston, Capt. MARK H. ROGERS, Boston.

*To Camp Devens*, Ayer, Mass., for duty, from Camp Devens, Capt. JOHN H. WYMAN, Medway.

*To Camp Jackson*, Columbia, S. C., for duty, from New York City, Lieut. APPLETON H. PIERCE, Leominster.

*To Camp Taylor*, Louisville, Ky., as orthopedic surgeon, Lieut. JOHN B. WEBSTER, Boston.

*To Camp Travis*, Fort Sam Houston, Texas, for duty, Lieut. CHARLES W. FINNERTY, West Somerville.

*To Fort Oglethorpe*, for instruction, from Camp Shelby, Capt. FRANCIS R. BURKE, Quincy. For instruction, Lieuts. WILBERT C. HARDY, DAVID W. HOUSTON, Jr., Boston; LUCIEN R. CHAPUT, ARTHUR O. McLAUGHLIN, Haverhill; CLARENCE B. LIVINGSTON, Lowell; WALTER H. LACEY, Quincy; RALPH W. HAYWOOD, JOSEPH H. SHORTELL, Salem.

*To Newport News, Va.*, for duty, from Camp Devens, Lieut. JAMES H. GETTINGS, Boston.

*To New York City*, Neurological Institute, for instruction, from Boston, Capt. HARRY P. CAHILL, Boston.

*To Rockefeller Institute* for instruction, and on completion *to Fort McHenry, Md.*, Lieut. BERNARD A. GODVIN, Boston.

*To Washington, D. C.*, for duty in the Surgeon-General's Office, Major KENDALL EMERSON, Worcester.

*To their homes* and honorably discharged, Lieuts. JOSEPH SEGAL, Boston; WILLIAM R. BYRNE, Framingham.

### Mexico

*To San Juan, Porto Rico*, for duty, from Camp McClellan, Capt SAMUEL H. HODGSON, Mexico.

### Michigan

*To Camp Custer*, Battle Creek, for duty, from Camp Custer, Lieut. HENRY O. McMAHON, Detroit.

*To Camp Jackson*, Columbia, S. C., for temporary duty, Lieut. FLOYD N. TOWN, Ann Arbor.

*To Camp Travis*, Fort Sam Houston, Texas, for temporary duty, from Fort Riley, Lieut. GEORGE D. TREADGOLD, Port Huron.

*To Edgewood, Md.*, United States Filling Station, from Camp Devens, Capt. VICTOR H. DuSOMOSKEOY, Flint.

*To Fort McPherson, Ga.*, for duty, from New York City, Lieut. JOHN T. HODGEN, Grand Rapids.

*To Fort Oglethorpe* for special inspection and on completion *to his proper station*, Major VICTOR C. VAUGHAN, Detroit. For duty, from Camp Sherman, Lieut. JEROME F. BERRY, Kalamazoo. For instruction, Lieut. THEODORE H. SMITH, Detroit.

*To Fort Riley* for instruction, Lieut. WILLIAM A. HYLAND, Grand Rapids. For duty with the board examining the command for mental and nervous diseases, from Fort Riley, Lieut. GORDON H. BAHLMAN, Flint.

*To New Orleans, La.*, Charity Hospital, for instruction and on completion *to his proper station*, from Fort Logan H. Roots, Major FRANK SUGGS, Detroit.

*To Rockefeller Institute* for instruction and on completion to Camp Lee, Petersburg, Va., for duty, from Camp Lee, Capt. HUGH McD. BEEBE, Ann Arbor.

*To West Point*, New York, for temporary duty, Capt. ALEXANDER R. McKINNEY, Saginaw.

*To his home* and to the inactive list, Capt. WALTER R. T. SHARPE, Romeo.

*To his home* and honorably discharged on account of physical disability existing prior to entrance into service, Lieut. EDWARD J. O'BRIEN, Detroit.

### Minnesota

*To Camp Devens*, Ayer, Mass., for duty, from Fort Oglethorpe, Lieut. REINHART G. OLSON, Nicollet.

*To Camp Pike*, Little Rock, Ark., for duty, Capt. WILLIAM G. CARHART, Mineapolis.

*To Fort McHenry, Md.*, for duty, Lieut. WALTER F. BLEIFUSS, Elgin.

*To Fort Oglethorpe* as instructor, from Fort Oglethorpe, Capt. EMIL S. GEIST, Minneapolis. For instruction, Capt. CHARLES H. KEENE, Minneapolis.

*To Fort Riley* for instruction, Lieuts. ALICK BERNSTEIN, Nay-tahwaush; BURTON A. BAIRD, HERMAN C. BUMPUS, Jr., CHARLES M. CLARK, STUART W. HARRINGTON, JAMES R. McVAY, Rochester.

*To New York City*, Neurological Institute, for instruction, Major WARREN A. DENNIS, St. Paul.

*To Toronto, Ontario, Winnipeg, Manitoba, Canada*, for study of returned soldiers suffering from peripheral nerve injuries, from Rockefeller Institute, Major JAMES F. CORBETT, Minneapolis.

*To Walter Reed General Hospital*, Takoma Park, D. C., from New York, Lieut. RICHARD B. GIRVIN, Villard.

*To West Point, New York*, United States Military Academy, from Fort Riley, Major DANIEL M. SHEWBROOKS, Minneapolis.

*To his home* and honorably discharged on account of physical disability which existed prior to his entrance into the service, Capt. JOHN A. FREEBORN, Fergus Falls.

### Mississippi

*To Camp Hancock*, Augusta, Ga., for duty, Lieut. FRANCIS S. HILL, Grenada.

*To Fort Oglethorpe*, for instruction, Lieuts. HAL C. JOHNSON, Dundee; LEE K. MAYFIELD, Inverness; JOHN H. WOOD, Ruleville; MARTIN L. HOLLAND, Schlater.

*To Washington, D. C.*, Washington Barracks, for duty, from Fort Oglethorpe, Lieut. ARTHUR A. SPARKMAN, Cleveland.

### Missouri

*To Belleville, Ill.*, Scott Field Aviation Camp, for conducting a nutritional survey of that camp, from Army Medical School, Capt. DON ROSCO JOSEPH, St. Louis.

*To Camp Pike*, Little Rock, Ark., for duty, Lieut. LAWRENCE D. ENLOE, Jefferson City.

*To Camp Travis*, Fort Sam Houston, Texas, for duty, Lieut. DAVID C. BOSSERMAN, St. Louis.

*To Camp Wadsworth*, Spartanburg, S. C., for duty, from Mount Clemens, Mich., Capt. FREDERICK E. WOODRUFF, St. Louis.

*To Fort Leavenworth, Kan.*, Department Laboratory, for duty, from Fort Riley, Lieut. GEORGE F. COOPER, Kansas City.

*To Fort Monroe*, Newport News, Hampton, Va., for temporary duty, and on completion *to his proper station*, Capt. GREENE D. McCALL, Fulton.

*To Fort Oglethorpe*, for instruction, Capts. IRA H. MILLER, Louisiana; ROBERT H. GIBSON, St. Louis; from Camp Meade, Capt. FREDERICK B. SPENCER, Hannibal; from St. Louis, Capt. FRANK J. TAINTER, St. Charles; from Camp Hancock, Lieut. ROBERT E. BYRNS, St. Louis; from Camp Taylor, Lieut. ROY W. JOHNSON, St. Louis. For instruction, Lieut. RAY E. WILSON, LeBelle.

*To Fort Riley*, for instruction, from Fort Riley, Lieut. ELMER J. BILLICK, Kansas City.

*To Hoboken, N. J.*, for temporary duty, from Fort Riley, Major EDWIN H. SCHORER, Kansas City. For duty, from Fort Oglethorpe, Lieut. CLARENCE M. WESTERMAN, St. Louis.

*To New York City*, for duty, Capt. HILLEL UNTERBERG, St. Louis.

*To St. Louis*, School of Plastic and Oral Surgery, Washington University, for instruction, Capt. WALTER C. G. KIRCHNER, St. Louis.

*To West Point, N. Y.*, United States Military Academy, from Fort Riley, Lieut. ROY F. MILLS, Odessa.

### Montana

*To Camp Dodge*, Des Moines, Iowa, for temporary duty, Major THOMAS C. WITHERSPOON, Butte.

### Nebraska

*To Camp Doniphan*, Fort Sill, Okla., for duty, from Camp Doniphan, Lieut. KARL F. E. WEGENER, Exeter.

*To Camp Travis*, Fort Sam Houston, Texas, for duty, Lieuts. JOSEPH D. McCARTHY, Omaha; RILEY E. ROCHE, Signey.

*To Fort Oglethorpe*, for instruction, from Camp Gordon, Lieut. NEIL P. McKEE, Atkinson; from Omaha, Lieut. ABRAHAM GREENBERG, Omaha.

*To Fort Riley*, for instruction, Lieut. JESSE F. STRONG, Barada. For instruction and on completion *to his proper station*, from Fort Riley, Lieut. CHARLES W. WAY, Wahoo.

*To Omaha*, Aviation Section, Signal Corps, as medical member of examining board and recruiting officer, from Omaha, Lieut. CLAUDE T. UREN.

*To Rochester, Minn.*, Mayo Clinic, for instruction, and on completion *to Camp Dodge*, for duty, from Camp Dodge, Capt. JOSEPH A. HENSKE, Omaha.

*To St. Louis*, Washington University, for instruction, Lieut. ROBERT C. PANTER, Dorchester.

*To his home* and honorably discharged, on account of physical disability which existed prior to his entrance into the Army, Lieut. IRVIA C. MUNGER, Lincoln.

## Nevada

*To Camp Devens*, Ayer, Mass., for duty, from Fort Oglethorpe, Lieut. ROLAND D. RUSSELL, Owygee.

*To Portland, Ore.*, Aviation Section, Signal Corps, for duty, from duty as a private at Camp Lewis, Lieut. RAY V. LARZALERE, Kimberly.

*To Western Department* for assignment to duty, Capt. CHARLES W. R. VON RADESKY, Carson City.

## New Jersey

*To Camp Alfred Vail*, Little Silver, N. J., for duty, Lieuts. GEORGE V. MORSE, Bloomfield; CHARLES F. VOORHIS, Palmyra.

*To Camp Joseph E. Johnston*, Jacksonville, Fla., for duty, from Camp Meade, Lieut. CHARLES P. LINGLE, Arlington.

*To Fort McDowell, Calif.*, for duty in his specialty, from Alcatraz, Calif., Lieut. EMIL W. MEYER, Passaic.

*To Fort Monroe, Va.*, for duty, from Fort Oglethorpe, Lieut. EARL E. GRIGGS, Haskell.

*To Fort Oglethorpe*, for instruction, Lieuts. CHARLES DABE, South Orange; CARROLL R. ERICHBAUM, Upper Montclair; from Army Medical School, Lieut. ALBERT G. HULETT, East Orange.

*To Mineola, L. I., N. Y.*, Hazelhurst Field, in connection with the Medical Research Board, from Washington, D. C., Capt. ELBERT S. SHERMAN, Newark.

*To his home* and honorably discharged on account of physical disability which existed prior to his entrance into the service, Major JAMES S. BROWN, Montclair.

*To his home* and honorably discharged, Lieut. HENRY J. HARP, Sussex.

## New Mexico

*To Walter Reed General Hospital*, Takoma Park, D. C., from New York, Lieut. SAMUEL H. ECKLES, Silver City.

## New York

*To Camp Custer*, Battle Creek, Mich., for duty, from Fort Brady, Lieut. JAMES L. HORNDORF, Rochester.

*To Camp Devens*, Ayer, Mass., for duty, from Fort Oglethorpe, Lieuts. JAY L. TOUCHSTONE, Blackwell's Island; RAPHAEL WOLFE, Brooklyn; ROY D. CHAMPLIN, Hobard; ARTHUR W. URAN, New York City.

*To Camp Dix*, Wrightstown, N. J., from Camp Lee, Capt. ROLAND C. MEISENBACH, Buffalo; to examine the command for nervous and mental diseases on completion of his leave of absence, from Camp Bowie, Lieut. WILLIAM G. DICKINSON, Oneonta.

*To Camp Doniphan*, Fort Sill, Okla., for duty, from Camp Jackson, Capt. FREDERICK C. ROBBINS, Hornell.

*To Camp Hancock*, Augusta, Ga., for duty, Lieut. FRED GLUCKSMAN, Bronx.

*To Camp Lee*, Petersburg, Va., for temporary duty, and on completion *to his proper station*, Major EDWARD K. DUNHAM, New York City.

*To Camp Meade*, Annapolis Junction, Md., for temporary duty, and on completion *to his proper station*, Major RICHARD H. HUTCHINGS, Ogdensburg.

*To Camp Shelby*, Hattiesburg, Miss., for duty, from Fort Oglethorpe, Lieut. JAMES F. H. LOOBAM, Brooklyn.

*To Camp Sherman*, Chillicothe, Ohio, as orthopedic surgeon in the camp, Capt. KARL OSTERHUAS, Brooklyn.

*To Camp Taylor*, Louisville, Ky., as division psychiatrist, from Camp Taylor, Capt. MORRIS J. KARPAS, New York City.

*To Camp Upton, L. I., N. Y.*, for duty, from Fort Oglethorpe, Lieuts. FREDERICK BERNSTEIN, Long Island; JASON H. CONGER, Utica.

*To Fort Bayard, N. M.*, for observation and treatment, from Fort Benjamin Harrison, Lieut. JOHN R. FISHER, Utica.

*To Fort Clark, Texas*, as divisional psychiatrist, from Camp Beauregard, Major EDWIN G. ZABRISKIE, New York City.

*To Fort Jay, N. Y.*, for duty, Lieut. ROBERT T. IRVINE, Ossining.

*To Fort McHenry, Md.*, for duty, Lieuts. WILLIAM D. CAWTHON, Brooklyn; LEE GOTTSCHALK, New York City; MAXWELL C. MONTGOMERY, Rome.

*To Fort Oglethorpe*, for instruction, from Camp Hancock, Capt. CHARLES H. ERWAY, Elmira; from Camp Meade, Capt. STEPHEN A. MAHADY, Utica; from Camp Shelby, Capt. JAMES W. PRICE, Saranac Lake; from Camp Gordon, Lieut. FRANCIS A. GLASS, New York City. For instruction, Lieuts. HYMAN DANISH, Bedford Hills; MERLE Q. HOWARD, Blackwell's Island; JULIUS M. BLANK, ISAAC E. GREENBURG, JOSEPH LINTZ, Brooklyn; EARL W. THEMA, Buffalo; JOSEPH FELSON, ARCHIE E. GORDIN, EDWIN HENES, Jr., PAUL B. JENKINS, I. EDWARD LISS, ALFRED F. ORTH, MAURICE RASHBAUM, New York City; GEORGE BIBBY, Pottersville; CHARLES R. MILLER, Ray Brook. For duty, Lieuts. FRANK J. MANGOLD, Brooklyn; JOHN L. BYRNES, Hudson Falls.

*To Fort Ontario, N. Y.*, for duty, from Fort Oglethorpe, Lieut. ARCHIBALD K. BENEDICK, Sherburne.

*To Fort Riley*, for temporary duty, Lieut. JOHN F. CURTIN, New York City.

*To Fort Sam Houston, Texas*, Department Laboratory, and on completion *to his proper station*, from Camp McClellan, Capt. RALPH A. KINSELLA, New York City.

*To Garden City, Long Island, N. Y.*, Aviation General Supply Depot, for duty, Capt. HERBERT R. CHARLTON, Bronxville; Lieuts. ARCHIE L. DEAN, Jr., CECIL R. FRANK, Brooklyn; HERMAN J. BALLEN, Long Island; JACOB BOWER, REVERDY V. W. ESTILL, HYMAN FISHER, ISAAC M. WILZIN, New York City; JOHN D. CARROLL, Troy.

*To Hoboken, N. J.*, for duty, Lieut. JAMES I. SCHOONMAKER, West Comakie.

*To Lakewood, N. J.*, for inspection, and on completion *to his proper station*, Major ALFRED COHN, New York City.

*To Newport News, Va.*, for duty, Lieut. RALPH COLP, New York City; from West Point, N. Y., Lieut. JOSEPH D. KELLY, Brooklyn.

*To New York City*, for instruction in orthopedic surgery, Lieut. ERNEST S. BULLUCK, New York City. Cornell Medical College, from New York, Lieut. WILLIAM G. HERRMAN, Brooklyn. Neurological Institute, for intensive training in neuro-surgical service, Lieut. EDWARD L. ROCHFORT, New York City.

*To report* to the Surgeon-General of the Army, from Army Medical School, Lieut. EARL H. LORMOR, Buffalo.

*To Rochester, Minn.*, Mayo Clinic, for instruction, and on completion *to his proper station*, from Camp Custer, Capt. HARRY R. STONE, New York City. For instruction, and on completion *to Camp Upton*, for duty, from Camp Lewis, Lieut. ANTHONY W. M. MARINE, Brooklyn.

*To Rochester, N. Y.*, for duty, from New York City, Capt. CLAYTON K. HASKELL, Rochester; Aviation Section, Signal Corps, for duty, Lieuts. HARRY A. MILLER, Ilion; RAYMOND J. BROWN, ERIC S. GREEN, Rochester.

*To Rockefeller Institute*, for instruction, Lieut. GEORGE P. OLCOTT, Jr. For instruction and on completion *to proceed to Army Medical School*, for duty, from New York City, RAY SEXTUS NELSON, New York City.

*To San Francisco, Calif.*, Letterman General Hospital, for duty if found physically qualified, Lieut. RAE W. WHIDDEN, New York City.

*To Saratoga Springs* to inspect and on completion *to his proper station*, Capt. C. BURNS CRAIG, New York City.

*To Trenton, Camp Dix, Wrightstown, New Jersey, and Philadelphia, Pa.*, to investigate the prophylactic stations established at these points, and on completion *to Washington, D. C.*, for duty in the Surgeon-General's Office, from New York City, Capt. ALEC N. THOMSON, Brooklyn.

*To Washington, D. C.*, for duty in the State War and Navy Department Building, from Army Medical School, Lieut. PHILIP W. DeGARMO, Rhinebeck.

*To Williamsbridge*, New York City, Long Island, for temporary duty, and on completion *to his proper station*, Lieut. LESTER L. ROOS, New York City.

*To the inactive list*, Major WILLIAM T. HELMUTH, New York City.

*To their homes* and honorably discharged, Capt. JOSEPH MUIR, New York City; Lieuts. CLARENCE L. SICARD, Amsterdam; CARSON C. FAULKNER, Arena; HAROLD M. WEINBERG, Brooklyn. On account of physical disability existing prior to entrance into the service, Capts. HENRY B. GILLEN, Cohoes; JAMES H. IRISH, Syracuse.

## North Carolina

*To Camp Greene*, Charlotte, for temporary duty on completion of his course at Neurological Institute, New York, Lieut. WILLIAM M. SCRUGGS, Rutherfordton.

*To Camp Upton*, Long Island, N. Y., for duty, from Fort Oglethorpe, Lieuts. WILLIAM H. SLOAN, Garland; ROBERT L. PAYNE, Monroe; ALLIE D. MORGAN, Scotland Neck.

*To Curtis Bay, Md.*, for duty, Lieut. JUNIUS R. VANN, Jr., Fayetteville.

*To Fort Oglethorpe* for instruction, Lieuts. CHARLES T. VERNON, Burlington; THOMAS M. STANTON, High Point; HUGH E. CLARK, Rocky Mountain. From duty as a private at Camp Sevier, Lieut. CHARLES H. LUPTON, New Bern.

*To his home* and honorably discharged on account of physical disability which existed prior to his entrance into the service, Capt. EDWIN B. FEREBEE, Raleigh.

## North Dakota

*To Camp Jackson*, Columbia, South Carolina, for temporary duty, from Fort Oglethorpe, Major ERIC P. QUAIN, Bismarck.

*To Fort Oglethorpe* for instruction, from Camp Taylor, Lieut. HERBERT B. WENTZ, Cerono.

## Ohio

*To Camp Devens*, Ayer, Mass., for duty, from Fort Oglethorpe, Lieut. JOHN A. FILAK, Lakewood.

*To Camp Joseph E. Johnston*, Jacksonville, Fla., for duty, from Camp Meade, Lieut. WILLIAM N. TAYLOR, Columbus.

*To Chicago, Ill.*, for orthopedic instruction, Lieut. JOHN K. LAWSON, Dayton.

*To Fairfield, Ohio*, Wilbur Wright Field, for duty, Lieuts. ALLEN H. DUNTON, Cincinnati; JEREMIAH E. KERSCHNER, Columbus.

*To Fort McHenry, Md.*, for temporary duty, from Columbus Barracks, Major GEORGE C. SCHAEFFER, Columbus.

*To Fort Oglethorpe* for instruction, Capt. FREDERICK C. HERRICK, Cleveland; Lieuts. SILAS P. THARP, Cincinnati; JOHN J. RAMEY, Rock Camp; WILLIAM C. PONTIUS, Warren; from Camp Taylor, Lieuts. IRVIN W. MAYBERRY, Scottown; CHARLES B. HAMMA, Springfield.

*To Fort Riley* for temporary duty, from Camp Wheeler, Capt. ALBIN M. PAINTER, Youngstown.

*To Jefferson Barracks, Mo.*, for temporary duty, from Camp Dodge, Capt. CARLTON D. POSTLE, Columbus.

*To Rockefeller Institute* for instruction in the serum therapy of pneumonia, Lieut. LOUIS A. MITCHELL, Newark.

*To Walter Reed General Hospital*, Takoma Park, D. C., from New York City, Lieut. ROY F. DRURY, Akron.

*To his home* and to the inactive list, Capt. ALBERT F. LONGEWAY, Cleveland.

*Honorably discharged*, Lieut. HERMAN W. HONOCK, Ridgeville Corners.

*To their homes* and honorably discharged on account of physical disability existing prior to entrance into the service, Lieuts. OTHO J. POWELL, Ashland; JOHN J. SOUTH, Massillon.

### Oklahoma

*To Camp Bowie*, Fort Worth, Texas, for duty, from Camp Bowie, Lieut. JAMES G. HARRIS, Muskogee.

*To Camp McClellan*, Anniston, Ala., for duty, from Camp Doniphan, Lieut. EDGAR A. JONES, Sayre.

*To Camp Travis*, Fort Sam Houston, Texas, for duty, Lieut. THOMAS J. NUNNERY, Granite.

*To Fort Riley* for instruction, Lieuts. CHARLES C. CONLEY, Frederick; ROBERT S. RILEY, Hartshorne; WALTER C. THRELKELD, Oklahoma City.

*To his home* and honorably discharged, Lieut. JOHN B. HAGGARD, Foraker.

### Oregon

*To Mayo Clinic*, Rochester, Minn., for instruction and on completion *to his proper station*, from Camp Beauregard, Capt. JUSTIN M. WAUGH, Hood River.

*To Portland*, Aviation Section Signal Corps, for duty, Lieuts. CHARLES E. HAWKS, Forest Grove; JOHN W. SIFTON, Hood River; CHARLES F. CROPP, Independence; FRANK L. RALSTON, La Grande; MEARLE C. FOX, Lakeview; ROBERT ST. C. GRAFFIS, WILLIAM A. SHEA, Portland; WALTER W. LOONEY, Salem; JOHN L. ELWOOD, The Dalles.

*To San Francisco, Calif.*, Letterman General Hospital, from Camp Lewis, Lieut. ERNEST H. STREIT, Portland.

*To Vancouver Barracks, Fort Canby, Fort Columbia, Fort Stevens, Washington*, to give instruction on personal hygiene, and on completion *to his proper station*, from Camp Lewis, Major CALVIN S. WHITE, Portland.

*To Western Department* for assignment to duty, Lieut. MERVIN H. SMITH, Clatskanie.

### Pennsylvania

*To Camp Devens*, Ayer, Mass., for duty, Capt. JAMES H. WHITECRAFT, Wilkinsburg; from Fort Oglethorpe, Lieuts. WILLIAM G. FRANCIS, Philadelphia; ROBERT B. BROWN, Pittsburgh.

*To Camp Gordon*, Atlanta, Ga., for duty, from Camp Doniphan, Lieut. JOHN P. MAUS, Philadelphia; from Neurological Institute, Lieut. STEPHEN S. LANDIS, Pittsburgh.

*To Camp Shelby*, Hattiesburg, Miss., for duty, from Fort Oglethorpe, Lieut. CLARENCE E. KING, Elmora.

*To Camp Travis*, Fort Sam Houston, Texas, for duty, Lieut. WILLIAM J. DAVIDSON, New Castle.

*To Chickamauga Park, Ga.*, for duty, from Camp Dix, Capt. WILLIAM J. REDDY, Shenandoah.

*To Edgewood, Md.*, United States Filling Station, for duty, Lieuts. CLARENCE W. FREEY, Dallastown; CHARLES C. WALLACE, Josephine; JOSEPH ASPEL, Philadelphia.

*To Fort Oglethorpe* for duty, from Camp Lee, Capt. HENRY A. ROTHROCK, West Chester. For instruction, Capt. THOMAS M. STAHLMAN, Pittsburgh; Lieuts. JOHN McG. DICKSON, Gettysburg; LEWIS L. ROGERS, Kingston; CHARLES E. NICHOLSON, HARRY RUBINSTEIN, Pittston; CARL B. ROSENKRANS, Stroudsburg; from Camp Gordon, Lieuts. WILLIAM W. WOODS, Mont Alto; HENRY G. GODFREY, Philadelphia; from Camp Hancock, Lieut. WILLIAM C. SPALDING, Cresson; from Camp Shelby, Lieuts. ANDREW ANDERS, Philadelphia; WILLIAM J. DAVIS, Wilkes-Barre.

*To Fort Riley* for instruction, Lieut. IRWIN J. OBER, Greensburg.

*To Garden City, Long Island, N. Y.*, Aviation General Supply Depot, for duty, Lieut. DONALD B. McHENRY, Bloomsburg.

*To New York City*, Cornell Medical College, for instruction in military roentgenology, from Camp Greene, Lieut. FRED W. DAVIS, Scranton. Neurosurgical School, Neurological Institute, for instruction, from Fort Oglethorpe, Lieut. JOHN E. QUAY, Philadelphia.

*To Philadelphia*, Evans Dental Institute, as instructor, from Camp Dix, Major GEORGE M. DORRANCE, Philadelphia.

*To Pittsburgh*, School of Military Roentgenology, as assistant instructor, from Pittsburgh, Capt. LEROY S. TOWNSEND, Beaver Falls.

*To report* to the Surgeon-General of the Army, from Army Medical School, Lieut. FRANK H. LONG, Coopersburg.

*To Rockefeller Institute* for instruction and on completion *to Camp Greene*, for temporary duty, from Neurological Institute, New York, Lieut. MARSHALL C. RUMBAUGH, Dorranceton.

*To Saratoga Springs, N. Y.*, for inspection, and on completion *to his proper station*, Capt. JOHN H. MUSSER, Ja., Philadelphia.

*To Schooley's Mountain, N. J.*, and *Ossining, N. Y.*, to inspect property and on completion *to his proper station*, Lieut. CHARLES C. GANS, Chambersburg.

*To their homes* and honorably discharged on account of physical disability existing prior to entrance into the service, Capt. WILLIAM T. VAN PELT, Philadelphia; Lieuts. GEORGE A. POUST, Hughesville; MALCOLM D. HOLBAN, Slatington.

*To their homes* and honorably discharged, Lieuts. FRANK L. BAUM, Athol; ARTHUR E. BROWN, Greenville; ABRAHAM FINKELPEARL, Pittsburgh.

*Honorably discharged*, Lieuts. BENJAMIN BOWMAN, Philadelphia; THOMAS B. JOHNSON, Towanda. On account of physical disability existing prior to entrance into the service, Lieuts. THOMAS E. McCONNELL, Parkersburg; ALPHONZO PADILLO, Philadelphia.

### Philippine Islands

*To Philippine Department* for assignment to duty, Capts. SAMUEL K. CARSON, Iloilo; BENJAMIN L. BURDETTE, PAUL CLEMENTS, CHARLES R. JOHNSON, JOHN A. JOHNSTON, Manila.

### Rhode Island

*To Camp Fremont*, Palo Alto, Calif., for duty, from Camp Fremont, Lieut. JAMES HAMILTON, Ja., Providence.

*To Camp Lee*, Petersburg, Va., for duty, from Fort Ethan Allen, Lieut. RICHARD METCALF, Providence.

*To Fort McHenry, Md.*, for duty, from Camp Upton, Lieut. NORMAN B. COLE, Newport.

*To Fort Oglethorpe* for instruction Lieut. CHARLES F. GORMLY, Providence.

*To Lakewood, N. J.*, for temporary duty, Lieut. HARRY D. CLOUGH, Providence.

### South Carolina

*To Camp Devens*, Ayer, Mass., for duty, from Fort Oglethorpe, Lieut. LANDRUM W. WOOD, Greer.

*To Camp Wheeler*, Macon, Ga., for temporary duty, from Neurological Institute, New York, Capt. SAMUEL C. BAKER, Sumter.

*To Fort Monroe, Va.*, for duty, Lieut. WARREN H. BURGESS, Sumter.

*To Fort Oglethorpe* for instruction, from duty as a private at Camp Jackson, Lieut. BELDRIDGE E. KNEECE, Moneta.

*To West Point, N. Y.*, United States Military Academy, from Fort Oglethorpe, Major THOMAS R. MARSHALL, Columbia.

### South Dakota

*To Fort Oglethorpe* for instruction, from New York City, Major TILLISON J. WOOD, Huron.

*To Fort Riley* for instruction, Lieut. OSCAR R. WRIGHT, Huron.

### Tennessee

*To Camp Upton*, Long Island, New York, for duty, from Fort Oglethorpe, Lieuts. WALTER A. BELL, Cloverdale; LLOYD S. NEESE, Del Rio.

*To Fort Monroe, Va.*, for duty, from Fort Oglethorpe, Lieut. AAREIEL E. G. GOODLEE, Murfreesboro.

*To Fort Oglethorpe* for instruction, Capt. JOSEPH B. HIBBITTS, Union City, Lieuts. HOWARD A. IJAMS, Knoxville; SAMUEL T. PARKER, Lexington; JAMES E. CARSON, Maryville; GRADY M. ALLISON, Mayland; WARREN G. ALFORD, Memphis; HARRY H. GOLDBERG, DAVID B. JAMES, Nashville; from Camp Gordon, Lieut. ENOCH SEALE, Nashville. For duty, Lieut. JAMES M. SMYTH, Camden.

*To Memphis*, Aviation Section, Signal Corps, for duty, from Portland, Ore., Capt. LOUIS LEVY, Memphis.

*To West Point, New York*, United States Military Academy, from Fort Oglethorpe, Capt. JOHN M. LEE, Nashville.

*To their homes* and honorably discharged, Lieuts. ALBERT B. DISMORE, Chattanooga; WALTER A. BELL, Cloverdale; ROBERT L. DOSSETT, Tullahoma.

### Texas

*To Camp Pike*, Little Rock, Ark., for duty, Lieut. CHARLES C. ADAMS, Longview.

*To Camp Sheridan*, Montgomery, Ala., from El Paso, Major WOODS W. LYNCH, Midland.

*To Fort Oglethorpe* for instruction, Capt. NATHANIEL T. MOORE, El Paso.

*To New York City*, Neurological Institute, for intensive training in his specialty, Lieut. ROBERT B. McBRIDE, Dallas.

*To San Antonio, Texas*, Brooks Field, Aviation Section, Signal Corps, for duty, Lieuts. WALTER A. BLACK, Mount Pleasant; BRADFORD R. A. SCOTT, San Antonio.

*To Southern Department*, Fort Sam Houston, for assignment to duty, Lieut. PHAU R. OUTLAW, El Paso.

*To his home* and honorably discharged on account of physical disability existing prior to entrance into the service, Lieut. EDWARD W. TISDALE, Clyde.

### Utah

*To Fort Oglethorpe* for instruction, from Camp Gordon, Lieut. GEORGE E. McBRIDE, Magna.

### Vermont

*To their homes* and honorably discharged on account of physical disability which existed prior to entrance into the service, Lieuts. FRANCIS J. ENNIS, Burlington; WALDO R. HARKNESS, Montpelier.

### Virginia

*To Camp Lee*, Petersburg, Va., for duty, Lieut. WILLIAM W. McCHESNEY, Abingdon.

*To Fort Monroe, Va.*, for duty, from Camp Lee, Capt. JOSEPH W. HOPE, Hampton; Lieut. EDWARD LeB. GOODWIN, Ashland.

*To Fort Oglethorpe* for instruction, Lieuts. HAMIL S. SCOTT, Emory; FRANK G. SCOTT, Orange; EVERETT R. FERGUSON, Richmond; FORREST T. SUMMERS, Snowville; from Richmond, Lieuts. LEVIN F. MAGRUDER, JOSEPH T. McKINNEY, ROBERT G. WIATT, Richmond.

*To Lake Charles, La.*, Gerstner Field Signal Corps Aviation Section, for duty, from Fort McHenry, Md., Major WILILAM E. DRIVER, Norfolk.

*To Newport News*, for duty, Lieuts. JAMES F. HUBBARD, Avon; VEOLE O. CARUTHERS, Ferrell; WILLIAM DeH. HITZHUGH, Morrisville; ROBERT WHITEHEAD, Richmond.

### Washington

*To Camp Lewis*, American Lake, for duty, Capt. FLOYD A. BIRD, Kelso.

*To Fort Riley* for instruction Capt. KENELM WINSLOW, Seattle.

*To New York City*, Neurological Institute, for instruction, Capt. HARRY E. ALLEN; from Camp Lewis, Capt. HARRY G. WILLARD, Tacoma.

*To Portland, Ore.*, Aviation Section, Signal Corps, for duty, Lieuts. SHIRLEY D. BARRY, Puyallup; SAMUEL GOODGLICK, ERNEST S. REEDY, Seattle; OLAF E. CHRISTEFFERSON, Tacoma.

*To Western Department* for assignment to duty, Capt. HARRY B. CLOUGH, Tonasket; Lieuts. LEWIS B. COLLIER, Seattle; JOHN W. ROSE, Walla Walla.

### West Virginia

*To Camp Devens*, Ayer, Mass., for duty, from Fort Oglethorpe, Lieut. MILTON D. FLANARY, Lakewood.

*To New York City*, Bellevue Hospital, for instruction, and upon completion to his proper station, from Camp Meade, Lieut. ERNEST F. GOTT, Bluefield.

### Wisconsin

*To Camp Grant*, Rockford, Ill., for duty, from Camp Grant, Capt. ELIAS BIBBY, Milwaukee.

*To Camp Hancock*, Augusta, Ga., for duty, Lieuts. JOHN F. SENNETT, Milwaukee; from Camp Hancock, ADELARD E. GENDRON, River Falls.

*To Camp Pike*, Little Rock, Ark., for temporary duty, Capt. EMIL F. BAUR, Milwaukee.

*To Fort Oglethorpe* for instruction, from Camp Gordon, Capts. HARRY C. MIX, Green Bay; MICHAEL R. WILKINSON, Oconomowoc; Lieut. HENRY J. PYLE, Zeeland.

*To Fort Riley* for instruction, Capt. GEORGE H. CONKLIN, Superior; Lieut. J. GREGORY HOFFMAN, Hartford.

*To Rochester, Minn.*, Mayo Clinic for instruction, and on completion *to Camp Sherman*, for duty, Capt. SAM W. DOOLITTLE, Lancaster.

*To West Point, New York*, United States Military Academy, from Fort Riley, Lieut. ARTHUR D. SMITH, Gilmanton.

*To his home* and honorably discharged on account of physical disability which existed prior to his entrance into the service, Lieut. CHARLES A. DAWSON, River Falls.

## Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST; SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION, PUBLIC HEALTH, ETC.)

### ILLINOIS

**Spiritualists to Be Arrested.**—The Illinois department of registration and education has had warrants issued for the arrest of several spiritualists, in order to determine the limits to which "healers" may go in treating ailments without first obtaining a license to practice medicine.

**Madison County Wants Sanatorium.**—At the meeting of the physicians of Madison County in Granite City, February 2, it was decided to take advantage of the law recently passed by the Illinois State Medical Board, to petition for the establishment of a tuberculosis sanatorium for the county.

**Winnetka Doctor in France.**—Dr. Alice Barlow Brown, Winnetka, has been in France for several months looking after the women and children back of the fighting line on the western front. The funds for Dr. Brown's work have been raised by Winnetka people through the chart system and the gift shop that has been established. A Winnetka dispensary has been established back of the lines near Toul, and at Toul and Nancy, Dr. Brown looks after more than 300 women and children a week.

### Chicago

**Smallpox in Theological School.**—Since January 21, twenty-eight cases of smallpox have occurred in a theological school on the west side. Those in charge of the school are said to oppose vaccination.

**Medical Schools Merge.**—It is reported that the Jenner Medical College and the Chicago Hospital College of Medicine have been merged and that the two institutions are now located at the site heretofore occupied by the latter.

**Arrested by Federal Authorities.**—Dr. Pierre Koglowski, whose office is at 975 Milwaukee Avenue, was recently arrested by the federal authorities. It is reported that a search in his office revealed literature opposed to the government's conduct of the war.

**Institute of Medicine to Hold Open Meeting.**—Prof. H. C. Sherman of Columbia University will speak on "Fundamental Requirements in Human Nutrition" before the Institute of Medicine of Chicago on February 27, at 8 o'clock, in Recital Hall, Fine Arts Building. The meeting will be opened to friends of the members, medical and nonmedical.

**Robert Koch Society.**—At the thirty-first meeting of the Robert Koch Society for the Study and Prevention of Tuberculosis, held February 21, at the City Club, a paper was read by Dr. Max Biesenthal on "Nontuberculous Lesions of the Lungs, Diagnosticated Tuberculous." Discussions were also held on "Clinical Findings," "Roentgen Ray" and "Complement Fixation."

**Service Flag Dedicated.**—The North Shore Branch of the Chicago Medical Society gave a dinner at the Edgewater Beach Hotel, February 16, at which more than 700 were present. Dr. Charles J. Whalen presided as toastmaster, and addresses were made by Drs. Charles E. Humiston, William A. Pusey, Wilbur F. Pool, John V. Fowler and Judge McEwen. A service flag with ninety stars was then presented by Dr. Joseph F. Biehn, president of the society, and was accepted on behalf of the medical department of the Army, and the members in service, by Col. Henry I. Raymond, department surgeon, Central Department. The Right Rev. C. P. Anderson, Bishop of Chicago, then delivered an address on "America's Place and Part in the World's War." The program was preceded by an entertainment and succeeded by dancing.

### KANSAS

**New Officers.**—At the annual meeting of the Salina County Medical Association, held in Salina, Dr. John K. Harvey was elected president, Dr. Charles M. Jenney, vice president; Dr. William N. Mowery, secretary, and Dr. Andrew G. Anderson, treasurer, all of Salina.

**Maternity and Infant Care in Rural Kansas.**—In Rural Child Welfare Series No. 1, Publication 26, the National Children's Bureau, Elizabeth Moore gives the results of a survey of a typical Kansas county (not named) covering prenatal and postnatal care of mothers and children together with general economic and sanitary condition, etc. In this particular county, in which the natural health conditions as to climate, etc., are good, the findings were favorable, on the whole, the infant mortality in the group studied in the district being 40 per thousand. Only one baby in five is weaned before it is 9 months old. The mothers are interested in learning all they can about the care of their children, showing this interest in the "babies' days" held throughout the county, at which infants are weighed, measured and examined. Only one infant in ten fails to have its birth recorded, the fault in this county lying with a very small number of physicians. It was found that, except in times of harvest and threshing, the work of the farm women is perhaps not over hard, but it is said that only of late and to a limited degree is prenatal supervision of mothers appreciated as a means of preventing needless deaths of mothers. According to the findings of the children's bureau, earlier and more frequent consultation of physicians and the employment of trained nurses as visitors before confinement are essential for adequate medical and nursing care. In the county studied, some progress has been made along these lines.

### KENTUCKY

**Chiropractor Indicted.**—It is reported that a chiropractor named W. H. Dunn was indicted at Louisville recently for practicing without a license from the state board of health.

**Nurses' Fees.**—The Jefferson County Nurses' Association has passed a resolution providing that, beginning with March 1, nurses will ask $35 a week for cases instead of $25, as at present.

**Home Nursing Course.**—Dr. Henry Enos Tuley, superintendent of the city hospital, has announced a three months' course in home nursing at the hospital, beginning February 11. It is hoped by this plan to make many young women available as nurses' aids in the hospitals of the Army, and to supply the demand for practical nursing in the home.

### MARYLAND

**Coeducation at the University.**—It is reported that the faculty of the University of Maryland has voted to admit women students beginning in October, 1918.

**Pneumonia on the Increase.**—The Bolhuisie Health Department reports that, despite the advent of warm weather and the inauguration of a campaign by Health Commissioner Blake, pneumonia appears to be on the increase, since there were reported in one day fourteen new cases and thirteen deaths. From the present prospects, the records of the health department for the week ending today, will show a high mortality.

**Conference with District Boards.**—Major Frank Billings, Chicago, medical aid to Provost Marshal General Crowder, addressed the physicians of the medical advisory boards, local boards and district boards of the state at Osler Hall, Baltimore, February 16. The address was followed by a conference between the physicians who are to pass on the physical qualifications of the men to be selected for service in the National Army. The purpose of the meeting was to give the physicians a better idea of the physical defects which disqualify a man for military service in order that a greater degree of cooperation between the members of the boards and the military authorities may be brought about.

**Bill on Practice of Medicine.**—In the general assembly, a bill was recently introduced to revise the laws of the state regulating the practice of medicine, surgery and osteopathy, to provide for the establishment of a board of examiners, and to define its duties. The bill has been agreed on by the Medical and Chirurgical Faculty of Maryland and by the osteopaths' association. The homeopathic profession is also included. The bill provides for the registering of all practitioners of medicine. Those failing to register are subject to arrest for misdemeanor. The board created by the bill is authorized to organize on the first Tuesday of June, 1918, and shall be constituted as follows: Six members of the present board of medical examiners, representing the Medical and Chirurgical Faculty, two members representing the Maryland State Homeopathic Medical Society, and two members representing the Maryland Osteopathic Association. There is no provision in the bill which specifically prohibits Christian Scientist healers from pursuing their calling. On the other hand, there is no clause which opens the way for the pursuit of their profession.

## MISSOURI

**Jackson County Appreciative.**—The Jackson County Medical Society has adopted a plan for caring for the practices of their members who have joined the Medical Reserve Corps. The members of the society will refund to the absent member or to his family one third of the fees collected from patients of members of the Medical Reserve Corps.

**New Liberty Loan Campaign.**—The St. Louis Medical Society has been requested by a representative of Secretary of the Treasury McAdoo, to take charge of the solicitation of physicians in St. Louis in the next Liberty Loan campaign. The society has accepted this responsibility and appointed Dr. Horace W. Soper chairman of the committee to conduct the campaign among doctors.

**Doctors Win Suits.**—A suit for alleged malpractice against three practitioners in the southeastern part of the state, sued jointly, was decided in favor of the physicians. Another case in the same section of the state was dismissed on motion of the physician's attorney, when the plaintiff failed to file a bond for costs as requested by the attorney for the physician and ordered by the court.

**Personal.**—Dr. Robert C. Strode, Mexico, was thrown from a buggy in a runaway accident, February 8, and painfully injured.——Dr. Charles R. Woodson, St. Joseph, who has been seriously ill, is now reported convalescent.——Dr. Eugene Carbaugh, Kansas City, was appointed city director of health, January 25, and has selected a new staff for the Emergency and General hospitals under the health boards reorganization.

**Sailors and Soldiers' Club.**—A sailors and soldiers' club has been organized by a number of women of St. Louis to furnish entertainment for sailors or soldiers living in St. Louis or passing through the city. The management of the club has asked that a committee of medical men be appointed to cooperate to give medical attention, if needed, to any of the men, and a number of hospitals of St. Louis have volunteered to give medical care to sick sailors and soldiers.

**To Prevent Abuse of Charity.**—Dr. Edward L. C. Richter, a member of the St. Louis Medical Society and alderman from his ward, has introduced a bill in the board of aldermen to prevent the abuse of charity in the city. The bill requires all persons who apply for charitable assistance or treatment at any of the city institutions or to any private individual or agency, to make a statement of his social and financial condition on blanks provided by the city. The bill follows closely the provisions of the New York City law. The St. Louis Medical Society has indorsed the measure and will work for its passage.

## NEW YORK

**Otisville Tuberculosis Hospital for Army.**—A large tract of land adjoining the municipal tuberculosis hospital at Otisville has been turned over to the government for the erection of a hospital to house 800 soldiers suffering from tuberculosis. The pavilions of the New York City Health Department on North Brother's Island have also been offered to the government. It is expected that the new hospital at Otisville will be completed within four months.

**Bill to Amend Public Health Law.**—There is before the legislature of this state a bill to amend the public health law in relation to reports of officials and employees to the state department of health. In the law to be amended, the duties of the health commissioner are defined as follows:

> The commissioner of health shall take cognizance of the interests of the health and life of the people of the state and all matters pertaining thereto.

An amendment introduced by Senator Whitney at the request of the health commissioner reads as follows:

> The written reports of officials and employees of the state department of health on questions of fact under the public health law, or under the sanitary code or any local health regulation, shall be presumptive evidence of the facts so stated and shall be received as such in all courts and places. The persons making such reports shall be exempt from personal liability for the statements therein made if they have acted in good faith.

### New York City

**Dinner to Overseas Hospital Staff.**—A farewell dinner was given to the Women's Overseas Hospital staff at the Cosmopolitan Club, February 11. The women expected to sail some time during the week. The Overseas Hospital is supported by the National Women's Suffrage Association.

**Hospital For Palestine.**—A gift of $25,000 has been donated by Mrs. Peter J. Schweitzer of Brooklyn for the purpose of building and maintaining an eye hospital in Palestine, where trachoma and other eye diseases are prevalent. A medical unit will leave for Palestine as soon as transports and transportation can be obtained.

**Personal.**—Dr. Vera Danschakoff of Moscow has been appointed assistant professor in anatomy at the College of Physicians and Surgeons.——Major Grayson M. P. Murphy, who recently resigned as Red Cross commissioner to Europe, has reported for duty with the American expeditionary forces.——Dr. John A. Harris, who retired from the practice of medicine to manage several business enterprises, has been appointed special police commissioner, without pay, to regulate traffic conditions in the city.——Dr. Royal C. Van Etten has been appointed temporary second assistant to the second surgical division of Roosevelt Hospital.

**War Hospital Opens New Section.**—The War Hospital of Columbia University, which occupies part of the site of the Columbia athletic oval at Gunhill Road and Bainbridge Avenue, opened a new section, February 15. Eighteen new wards have been opened, doubling the original hospital capacity, so that 1,000 patients may be cared for at the same time. The hospital is intended exclusively for the care of soldiers brought back from France. Col. Edward R. Schreiner, chief surgeon and commander of the hospital staff, has been ordered to the government hospital at Fort Riley, Kan., and will be succeeded by Major William H. Bishop.

## NORTH DAKOTA

**Northwestern Society Elects Officers.**—The annual meeting of the Northwestern Medical Association was held at Minot, January 15, and the following officers were elected: president, Dr. Edward M. Ransom, Minot; vice president, Dr. Frederick K. Kolb, Granville, and secretary-treasurer, Dr. Peter A. Nestos, Minot.

**Appeal for Reorganized Health Department.**—The *Bulletin* of the state board of health for January contains the statement that the present state health organization is incapable of securing satisfactory results. In demanding a reorganization, the *Bulletin* sets forth, among other things, the following facts: Every eight hours a citizen of North Dakota dies from tuberculosis, and 26 per cent. of deaths in the state occur among children under 5 years of age. Only about 2

cents per capita are spent for health protection and, as a consequence, the state ranks thirty-third in the list of states in respect to efficient health service. There is no adequate system of health bookkeeping, that is, registration of births and deaths and reporting of infectious diseases.

## PENNSYLVANIA

**Revocation of Licenses.**—The attorney-general of Pennsylvania has ruled that the presence of all of the members of the Pennsylvania Bureau of Medical Education and Licensure is necessary to revoke a license or to vote recognition to a medical college, whereby its graduates may become eligible for a license in that state.

**Remission of Dues.**—In November the Bucks County Medical Society adopted resolutions remitting the dues of members in active military service.——The Philadelphia County Medical Society has unanimously adopted the following recommendation of the board of directors, "The board of directors recommend that all the dues of the members who have gone into active military service be remitted for the present year."

### Philadelphia

**Memorial for Captain Bradley.**—Memorial services for Capt. Clarence D. Bradley, M. R. C., U. S. Army, were held in the forum of the Temple University, February 5. Dr. Bradley died from cerebrospinal meningitis, January 29, at Camp Greene, Charlotte, N. C.

**Graduate Schools Merge.**—It is reported that the Philadelphia Polyclinic and College for Graduates in Medicine has merged with the Graduate Medical School of the University of Pennsylvania. The latter was formed a year or two ago by the merging of the Medico-Chirurgical College and Hospital.

**Smallpox Quarantine.**—Quarantine was established for the second time in a week in the block bounded by Oxford Street, Columbia Avenue, Twenty-Fourth and Twenty-Fifth Streets, when four women, residing in a lodging house in that district, suspected of having symptoms of smallpox were removed to the Philadelphia Hospital for observation.

**New Dean.**—The board of corporators of the Woman's Medical College of Pennsylvania announces the election of Dr. Martha Tracy as dean of the college. Dr. Tracy is a graduate of Bryn Mawr College, 1898, and of the Woman's Medical College in 1904. She has occupied the chair of physiologic chemistry and hygiene at the college for a number of years and has been acting dean since June 1917.

**Personal.**—Dr. Max H. Bochroch has been appointed visiting psychiatrist to the Philadelphia General Hospital.——Dr. Henry H. Lott has been appointed operating chief to the laryngologic dispensary of the Jefferson Medical College Hospital.——The civil service commission named the following men as eligible for appointment to positions as assistant diagnosticians: Drs. Howard C. Fretz, Maurice Ostheimer, George E. H. Johnson and Clarence W. Schaeffer; and for appointment as supervising medical inspectors in the department of health and charities, Drs. Joseph D. Lehman and Martin J. Nevinger.

**Venereal Ward for Women and Children Established.**—Building alterations are nearing completion at the college hospital of the Woman's Medical College of Pennsylvania, where a venereal ward and dispensary is soon to be opened for the care of women and children. In the equipment and maintenance of this new department the Woman's Hospital, the West Philadelphia Hospital for Women and the college hospital will cooperate. The resident medical and nursing staffs of the three hospitals will participate in the regular rotation of service. Dr. Rose Hirschler has been elected chief of the department.

## VIRGINIA

**Personal.**—Dr. Joseph C. Dunford, Norfolk, on duty at Camp Lee, is reported to be ill in the base hospital, Camp Lee.——Dr. George M. Converse, U. S. P. H. S., has begun the work of consolidating the Norfolk County and Portsmouth City Health Board, and forming a health district.——Dr. T. Edwin Baird has been appointed physician to the Norfolk City Home.——Dr. Arthur L. Wilson has been elected president of the board of health of Lynchburg.

## CANADA

**Queen's Bars Negro Students.**—No more negro students are to be admitted to Queen's University, Kingston, Ont. This is due to the objection of patients to the presence of negroes at hospital clinics. There are now fourteen negro medical students at Queen's and these will be allowed to finish their fourth, but not their fifth year, because of the fact that most clinical work has to be done in that year.

**Promotions.**—Under the date of January 30, the London *Gazette* gives the following promotions in the Canadian Medicals: Capts. Henry E. Paul, Fort Williams, Ont.; R. F. Flegg, Ottawa; George O. Taylor, Moncton, N. B.; Robert M. Luton, McW. Taylor, Alexander H. Taylor, Goderich; M. C. W. Brown, D. McClellan, P. W. Pilcher, Nelson G. Cooper, Prince Albert, Sask.; Thomas L. Butters, Lafleche, Sask.; George C. Hale, Henry P. Wright, to be temporary majors.

**McGill's Service.**—More than 2,000 students, graduates and teachers from McGill University, Montreal, have joined the military forces in the three and one half years of war. Three hundred of these have gained military honors, and 236 are among those who have been killed. The McGill corps was originally organized by Sir Auckland Geddes, now director-general of recruiting in England, who was a professor of anatomy at McGill, when the war broke out.

**Birkett Returns.**—Col. Herbert S. Birkett, C. M. G., dean of the medical faculty of McGill University, Montreal, and who has been overseas in command of their base hospital, has returned home on account of ill health. Col. John M. Elder has taken over the command of the hospital. While in England, Colonel Birkett visited many of the British and Canadian hospitals; and he speaks especially of the remarkable work which is being done in the Sidcup Military Hospital where all facial deformities are given special attention. He also speaks in terms of the highest praise of the work at St. Dunstan's Hospital, where blind soldiers are given a new view of life, learning basket making, stenography, telephone operating, etc. Colonel Birkett says the only way to win the war is to kill the Bosches.

**University News.**—Prof. Watson Bain, occupying the chair of applied chemistry, University of Toronto, has been granted leave of absence for the duration of the war. He is going to Washington, D. C., where he will be on the staff of the Canadian mission.——At the antitoxin laboratory of the University of Toronto, the doctors are working toward securing a serum which will counteract the gas used on the soldiers by the enemy at the front. Capt. Alfred H. W. Caulfield, who went overseas with the University Base Hospital three years ago but who has been doing special research work in London, England, has been brought back from overseas to engage in the work.——Capt. Don A. Warren, M.B., Hamilton, who recently resigned from the R. A. M. C., has been given a commission in the C. A. M. C., and has been appointed to the King's Canadian Red Cross Hospital at Bushy Park, England.

**Public Health Exhibits.**—The Ontario Board of Health has established public health, child welfare, and tuberculosis exhibits which include moving pictures. Each exhibit is in charge of a competent man and a nurse, who, during the fall and winter months, make a tour of the various towns of the province in the interest of public health education. The nurse who accompanies the exhibit endeavors to secure the cooperation of the local physicians in holding public clinics for children's diseases, care of babies, etc.——Since the war began, the Ontario Board of Health has distributed 1,622,962 doses of vaccine, which amount has provided three doses for each soldier, the total value being $170,000. It has also distributed 10,150 doses in Newfoundland, worth about $1,000. All the typhoid and paratyphoid vaccine is distributed free. There has been practically no typhoid among the Canadian forces.

**Hospital News.**—The National Cash Register Company's property in Toronto has been purchased by the Military Hospitals Commission, and is to be converted into a hospital for returned soldiers. It is to be developed as the chief Canadian center for orthopedic work. The existing building has accommodation for about 400 patients, but additions will increase its capacity to 900 patients. It is intended to make it a 1,500 bed hospital. The Orthopedic Hospital in North Toronto will continue to be employed as an auxillary to the new center.——The board of control, Toronto, in keeping down the tax rate for 1918, has decided that no grants should be made this year to hospitals other than the per diem rate set forth in the statutes. Late in 1917, the hospitals of Toronto secured a special grant of $189,582 from the city. The treasurer of the city brought in an estimate of $200,000

for the present year, but the controllers struck the item out. This policy will probably hasten a financial arrangement whereby all the hospitals will come under municipal control.

**Personal.**—Col. William B. Hendry, Toronto, recently in command of the University of Toronto Base Hospital at Basingstoke, England, has received the distinguished service order.——Capt. M. Joseph Casserly, R. A. M. C., Toronto, has returned to England.——Dr. Ian Thompson, a brother of Dr. Finlay Thompson, Toronto, a native of Nefoundland, was surgeon on the British destroyer *Strongbow*, when that vessel was sunk in a recent naval engagement in the North Sea.——Dr. Roberts, a member of the provincial government of New Brunswick, is taking an active part in providing medical inspection for the schoolchildren of that province.——Major George T. McKeough, C. A. M. C., Chatham, Ont., has been appointed honorary president of the Great War Veterans' Association.——Col. Leonard C. Harris, C. A. M. C., Moncton, N. B., who is in command of a 2,000 bed hospital at Whitby, England, was recently mentioned in despatches by General Haig.——Dr. Edna Mary Guest, Elginfield, Ont., has been appointed medical officer of the Scottish Women's Hospital on the island of Corsica.——Major Julian S. Boyd, C. A. M. C., has been appointed senior medical officer at the Toronto Exhibition Camp.——Capt. Archibald F. Laird, R. A. M. C., Blenheim, Ont., has been awarded the military cross. Captain Laird advanced with his men in the face of heavy machine gun fire, and remained for three days until the ground was consolidated. Although wounded in the shoulder, he continued to attend the wounded. He has been mentioned in despatches by Sir Douglas Haig.——The military cross has been awarded to Capt. Dimock S. Cassidy, R. A. M. C., formerly of Tatamagouche, N. B. He went down into a particularly dangerous mine to give aid to the wounded. He was severely gassed and is now undergoing treatment in a London hospital, England.——Capt. William Bernard MacDermott, M.D., Lang, Sask., who has been in Russia with the Anglo-American hospital, recently disbanded, is back in England.——Capt. Donald A. Warren, Hamilton, Ont., has resigned his commission in the R. A. M. C. He went to France in November, 1915, and while attached to the Royal Warwickshire Regiment, won the military cross.——Dr. William C. White, late of Pittsburgh, who has been connected with health service of the volunteer relief work in France, has been made chief of the bureau of tuberculosis of the American Red Cross in France.——Capt. James A. Dickson, Toronto, with the R. A. M. C. in India and Mesopotamia, returned to Toronto in January.——Capt. Charles J. M. Willoughby, Toronto, is returning from Mesopotamia.——Capt. Eric K. Clarke, Toronto, son of Dean Clarke of the faculty of medicine, has left for England to be attached to No. 4 University of Toronto Base Hospital, Basingstoke, England.——After a lengthy service in Greece and England, Col. Alexander Primrose, Toronto, is on his way home. He has lately been consultant in surgery to the Canadian forces in England.——Drs. James T. Wall and C. M. McGill, both of McGill University, Montreal, have been elected members of the Royal College of Surgeons.——Lieut.-Col. Norman S. Shenstone, Toronto, has returned after several months in the Ontario Military Hospital, Orpington, England.——Lieut.-Cols. Irving H. Cameron and Donald McGillivray, Toronto, have returned to Toronto from a tour of inspection of the military hospitals as far as Victoria, B. C., and have proceeded to Ottawa.

## GENERAL

**Dr. Means Honored.**—At the recent meeting of the Association of American Medical Colleges in Chicago, Dr. William J. Means, Columbus, Ohio, who for many years has been chairman of its executive council, was elected as president. Dr. Means has been a prominent figure in the progress in recent years in medical education in the United States.

**Bequests and Donations.**—The following bequests and donations have recently been announced:

New York Foundling Hospital, $10,000, the proceeds of a benefit opera recently given.

People's Hospital of Philadelphia, a bequest of $10,000 by the will of Emilie C. Christman.

St. Joseph's Home for Orphans, Sisters of the Poor, and Sisters of Mercy Hospital, Philadelphia, each equal shares of the estate of John J. O'Maley, amounting to about $67,500.

Presbyterian Hospital of Chicago, $10,000 and bequests to the Chicago Home for Incurables, Visiting Nurses' Association and other charities, by the will of Ettie Soper Smith.

Citizens Aid Society, Minneapolis, about $1,000,000, as an endowment fund, by the will of George H. Christian.

**Sanatorium Association Meeting.**—The first mid-winter session of the Mississippi Valley Sanatorium Association will be held at the Municipal Tuberculosis Sanatorium, Chicago, March 12 and 13. On the first day there will be a symposium on sanatorium administration, taking the place of the laboratory in the sanatorium, practical graduated exercises, and education of the tuberculous. In the afternoon the effect of war on the tuberculosis sanatorium and the question of whether temporary construction of buildings for the care of the tuberculosis is practical will be taken up. In the evening, Health Commissioner Robertson will deliver an address on "Suppression versus Repression of Tuberculosis in the Community." The morning of the second day will be devoted entirely to the symposium on the "Tuberculous Child." including the housing of the tuberculous child, the handling of contacts by the sanatorium, and the differentiation of the potentially tuberculous child from the active tuberculous child. In the afternoon papers will be read on "Looking Forward Into Tuberculosis Sanatorium Work," and "Primary and Secondary Pulmonary Tuberculosis."

## LONDON LETTER

LONDON, Jan. 29, 1918.

### Trench Fever

Among the new maladies brought to light by the war is a condition of obscure causation termed "trench fever," a name given because it arose in the front area and not on the lines of communication until the establishment of schools of instruction, to which men came from the front area, created foci of infection. Several organisms, including spirochetes and a hemogregorin, have been described as the cause, but none has stood the test of criticism. The director-general of the medical services in France appointed a committee consisting of Lieut.-Col. W. O. O. Beveridge and Cols. Sir John Rose Bradford, Sir Wilmot Herringham and Sir William Leishman to investigate various forms of fever of unknown origin which, though they never caused death, were very prevalent in the army. The aims of the committee were: (1) to determine whether these cases of unknown pyrexia include more than one class of fever, and if so to classify them; (2) to observe the symptoms distinctive of each class that might be established, and thereby to distinguish one class from another and from all known fevers; (3) to investigate the etiology and pathology of these fevers, and (4) to discover the best means of prevention and cure. They have now presented a report on the first two of these objects. They find that the cases of pyrexia of unknown origin may be divided into three classes: (*a*) the relapsing class (trench fever); (*b*) a class with a single short, initial bout of fever and no relapse, and (*c*) a class with prolonged initial fever. The cases of trench fever form two groups: (1) regular relapsing with definite normal intervals, and (2) irregular relapsing in which the intervals are not so definite or, if definite, in which the temperature remains above normal. The cases of trench fever occurred in all situations—trenches, dugouts, huts, tents and billets. The onset was usually sudden. Headache was invariable; it was nearly always frontal, and often referred to the back of the eyes. There was often conjunctivitis (pink eye). Other symptoms were shivering, dizziness or giddiness; several complained of weakness or faintness. There were pains in the back or lower limbs in most cases. In a few there was no pain other than headache at the onset, and this was sometimes the only pain throughout. On admission to the hospital, the patients complain of headache and pains in the lower limbs, usually in the thighs and knees. They often look very toxic, and are flushed and sometimes drowsy. The tongue has a central streak of yellow or brown fur with red edges, the appetite is bad, the bowels constipated. There is no distention of the abdomen. In a few cases there was a trace of albuminuria, which disappeared in two or three days. The temperature chart is marked by a series of bouts of fever, lasting three or four days, in which the temperature as a rule rises rapidly and falls rather more slowly. The bouts vary greatly in number; most patients have three or four. The spleen was sufficiently large to be palpable below the ribs in about a third of the cases. Apart from headache, which is universal and often very persistent, pains are felt in various parts of the body, especially in the lower limbs. In Class B there was only one short initial bout of fever, lasting under six days. The symptoms resembled those of the preceding class. In Class C there were symptoms like those of Class A, but the fever was prolonged, and lasted from six to fourteen days or longer.

### The Food Situation

With the continuance of the war, the food problem is becoming more difficult, and rationing of the most important foods is coming into force. So far only sugar has been rationed—at the rate of 8 ounces per head per week. February 25, the rationing of meat and fat will come into force. A drastic order limiting the consumption of meat and fats has been introduced for hotels. Two meatless days are to be observed. In the London area the days will be Tuesday and Friday, and elsewhere in the United Kingdom Wednesday and Friday. No meat may be served with breakfast. No milk may be served or consumed as a beverage, except with tea, coffee, cocoa or chocolate, or by children under 10 years of age. Guests must provide their own sugar for sweetening beverages. No more than 1½ ounces of bread, cake, bun, scone or biscuit may be served with afternoon teas. The quantity at present allowed is 2 ounces. The permitted quantities of meat, flour, bread, sugar (except in the case of continuous residents) butter, margarin and other fats must not exceed the gross quantities allowed for the meals served during a week, ascertained in accordance with the following scale of average quantities per meal:

| | Meat, Oz. | Sugar, Oz. | Bread, Oz. | Flour, Oz. | Butter, Margarin and Other Fats, Oz. |
|---|---|---|---|---|---|
| Breakfast | 0 | 0 | 3 | 0 | ⅜ |
| Luncheon (including midday dinner) | 3 | ½ | 2 | 1 | ⅜ |
| Dinner (including supper and meat tea) | 3 | ½ | 3 | 1 | ⅜ |
| Tea | 0 | 0 | 1½ | 0 | ¾ |

The basis of rationing under the old order is as follows:

| | Meat, Oz. | Sugar, Oz. | Bread, Oz. | Flour, Oz. |
|---|---|---|---|---|
| Breakfast | 2 | ½ | 2 | 0 |
| Luncheon (including midday dinner) | 5 | ½ | 2 | 1 |
| Dinner (including supper and meat tea) | 5 | ½ | 2 | 1 |
| Tea | 0 | ½ | 2 | 0 |

It will be observed that, while the bread ration has been increased by 1½ ounces, the quantity of meat permitted is reduced from 12 to 6 ounces a day. Breakfast is going to be a difficult meal in the business type of hotel. Apparently no milk may be served with porridge, and the bacon course is forbidden. On a meatless day no meat, poultry or game may be served or consumed in any public eating place. Between the hours of 5 a. m. and 10:30 a. m., no meat, poultry or game may be served or consumed on any day. No milk may be served or consumed as a beverage or as part of a beverage, except with tea, coffee, cocoa or chocolate as usually served; but it may be given to children under 10 years of age. Exemption from these provisions relating to meat and milk may, however, be obtained by a resident in a public eating place on the certificate of a duly qualified physician showing that it is in the interest of his health. Regarding teas in public places, no person may be served with or consume between the hours of 3 p. m. and 5:30 p. m. more than 1½ ounces in the whole of bread, cake, bun, scone and biscuit.

The Army Council has decided to reduce in certain respects the food ration of those men in the home armies whose duties approximate to those performed by the civilian population. This has been prompted by the temporary deficiency in the supply of certain essential foods for the civilian population, particularly meat. This means a heavy reduction in the number of calories represented by the dietary, and also considerably complicates the arrangements for rationing large numbers of men. For similar reasons and particularly for the relief of tonnage, it has also been decided to reduce the grain allowance to horses and other animals employed by the armies at home. For the purposes of the new scale of reduced rations, the home forces have been divided into two categories: (*a*) troops under training for service over sea and mobile troops engaged in home defense; (*b*) all other troops at home. In the case of the former troops, the present home scale of rations, which is considerably less than that which prevails at the front, will remain unaltered. In the case of the troops in the second category, the following changes are to be made: meat from 12 ounces a day to 8 ounces; sugar from 2 ounces a day to 1 ounce; bacon from 2 ounces a day to 1 ounce; tea from ¾ ounce a day to ⅜ ounce. Thus the meat ration is reduced by one third and sugar and bacon by one half, while the tea ration is increased by one half. The revised sugar allowance (1 ounce) is slightly less than the present allowance for civilians, which is 1¼ ounce a day. In the case of horses, mules and other beasts of burden, the daily oat ration is to be reduced by 2 pounds per head. This, it is hoped, will not only effect a great saving in tonnage, but also release valuable food for human consumption.

## PARIS LETTER

PARIS, Jan. 24, 1918.

### Antitoxin Treatment of Gas Gangrene

Dr. Sacquépée recently discussed the antitoxin treatment of gas gangrene before the Réunion médico-chirurgicale de la IV-e Armée. This being, first of all, a toxic disease, and the intoxication being manifestly of microbic origin, it is evident that these germs are toxin producing. In gas gangrene, until now, only two species of germs have been isolated, the *vibrion septique* and the *Bacillus bellonensis*. Both organisms produce toxins in vitro, and both are used easily for the production of an antitoxic serum. So far as the prophylactic treatment is concerned, in cases in which much tissue is destroyed (large arterial lesions, large hematomas, and much destruction of inaccessible muscle tissue), the treatment *à distance* is difficult because there is no circulation through the region, and hence no means of defense. However, even under these circumstances the treatment is always of some value, because the interruption of the circulation is not always complete. In some cases in which one cannot prevent entirely the appearance of gas gangrene, grafted on an ischemic gangrene, one can at least check its evolution.

#### METHOD OF PROCEDURE

The serum treatment is carried out as follows: 1. Under the skin, *à distance*, from 30 to 40 c.c. of each serum are injected. 2. Into the depths of the limb, to the limits of the necrotic tissue (or susceptible of necrosis), the same dose of serum, diluted with physiologic sodium chlorid solution, is injected. 3. Serum is injected into the wound. These three injections are repeated after twelve hours. In other cases only 20 c.c. of each serum are injected. As for the curative treatment, the chances of success are always greater the earlier the serum is used. When possible, one should determine the pathologic conditions present. In the edematous form it is the *B. bellonensis* which is usually present, and then more of the corresponding serum is injected. On the other hand, in the gaseous form, both germs are usually present; if, as is the rule, the presence of one or the other germ is not disclosed sufficiently early, then the two serums in equal quantities are injected. As a general rule, in all forms and whatever the condition, at least three injections of high serum strength must be made. For the edematous form the anti-bellonensis serum is used, 80 c.c., half being injected intravenously and half subcutaneously, and 20 c.c. of the anti-vibrion septique serum are injected subcutaneously. The subcutaneous injection, in the same dose, is repeated after four or six hours, and then again after from sixteen to twenty hours. The general state of the patient must be the guide in the treatment. For the gaseous form, from 30 to 50 c.c. of each serum are injected, half being injected intravenously and half subcutaneously. The injections as outlined above are repeated in the treatment of the edematous form. The results obtained from this method of treatment have been very satisfactory.

### Early Secondary Suture of War Wounds

At one of the recent meetings of the Société de chirurgie de Paris, Drs. Barthélémy, Morlot and Jeanneney demonstrated the good results obtained by secondary suture in forty cases of war wounds. The following technic was used: The disappearance of all inflammatory symptoms and the elimination of all dead tissue are waited for. The ulcerated surface is circumscribed by an incision passing through the healthy skin at least 5 cm. from the edge of the wound. The incision extends down to the aponeurotic fascia so that the whole ulcerated area can be removed as if it were a tumor. The field of operation is disinfected with ether; gloves and instruments are changed. If too much traction would be made on the wound edges by bringing them into contact, the skin is undermined with a bistoury or scissors as far as is necessary to loosen it up to secure perfect apposition of the wound edges without traction. If the wound is rather large, the deeper layers should be sutured with catgut. This suture assures hemostasis, which must always be complete; this also facilitates the skin suturing. The skin wound is closed with horse hair, perfect approximation of the wound edges, particularly at the angles of the wound, being obtained. One should always close the wound on the limbs in the long axis, having recourse, if necessary, to a releasing incision (*de débridement*). For the succeeding days, the temperature should be watched. The dressing is renewed in about forty-eight hours. If there is any stitch hole suppuration, the wound edges at this point, are separated, and a little ether is injected daily.

RESULTS

The results obtained have been as follows: In twenty-six cases, primary union or speedy union occurred in less than fifteen days; in eleven cases, rapid union occurred, in spite of some suppuration at one stitch hole and a little exudation at one portion of the wound, healing requiring only exceptionally more than a month; in two cases the results were mediocre, owing to faulty technic, the suture having been made perpendicularly to the axis of the limb; finally, in one case, union, not having been preceded by excision of the infected tissue, did not take place. A second operation performed some days later, in accordance with the usual technic, resulted in a complete success. In a general way, after such suture, a complete cure was obtained in from fifteen days to a month, only exceptionally requiring more time. The operation should be performed, ordinarily, about fifteen days after the patient enters the hospital; the average stay in the hospital, counting from the date of the wound, was about forty days. All the cicatrices are soft, pliable and nonadherent, and the wounded, that is, those having wounds which were amenable to this treatment, quickly returned to their corps. The operation has always reduced the period of invalidism considerably, and often the evacuation of the wounded into the interior has been made unnecessary. The technic is simple and free from danger. In the majority of cases the operation was performed under local or regional anesthesia, chloroform being resorted to only when the injury was very extensive so that local anesthesia was contraindicated.

### American Red Cross in France

During the five months since the first delegates arrived in Paris, the American Red Cross has been very active. Among its first activities was the establishment of eleven canteens at the front, which have served, to date, more than 500,000 hot drinks to the tired French soldiers who are on their way to the trenches or are returning. Three canteens have been established along the line of communication. An infirmary was opened at Toul where, since July 27, 400 children less than 8 years of age have been sheltered from the danger of asphyxiating bombs; finally, an American hospital for repatriated children was opened at Evian with a dispensary in which 250 children are examined daily; and three large consignments of merchandise were sent to the dépôts of the departments of the Somme, the Oise and the Aisne. In addition to these emergency measures, the American Red Cross has also inaugurated a social service department which will do especially tuberculosis work (in cooperation with the Rockefeller commission) and in the prevention of infant mortality.

## CUBA LETTER

HAVANA, Feb. 12, 1918.

### Appointment of New Professors

Dr. J. E. Ferran has been appointed professor of clinical surgery at the University of Havana in place of Dr. Raimundo Menocal, deceased. Dr. Rafael Menocal has succeeded Dr. Ferran as assistant professor of clinical surgery.

### New Medical Journals

*El Eco Científico*, a monthly journal devoted to general practice, is being published in Ciego de Avila, Camagüey. This is the first Cuban medical journal to be published outside of Havana.

The editors of the *Revista de Pediatria* have resumed the publication of their journal in Havana, under the leadership of Drs. C. and A. Inclán and Professor A. Aballi. The paper will appear the first of every month and will deal with pediatrics exclusively.

### Red Cross Work

The Cuban Red Cross Committee is raising a fund to build and support a hospital in France. An especial opera performance was given a few days ago, and the proceeds of it were devoted to the Red Cross fund. The most prominent people, banking houses, and merchants of Cuba also contributed to this fund, and all the employees of the government, provinces and cities gave one day's salary. Mrs. Menocal, the wife of the president of the republic and the leader of the Cuban Red Cross, reports that she expects to have a million dollars soon.

### Reorganizing the Army Medical Corps

Colonel Hada of the U. S. Army is said to be in Cuba on a special mission to reorganize the medical corps of the Cuban army. The medical strength of troops is 15,000, and the Medical Corps is composed of two lieutenant-colonels, three commanders, fourteen captains and twenty-one lieutenants. Six new military hospitals will be built in each of the six provinces of Cuba and the number of medical officers increased.

### Isle of Pines Spring Water Declared Unfit for Public Use

The Board of Health Laboratory found in specimens of "La Cotorra" mineral water of Isle of Pines, 8,000,000 colonies of colon bacilli per cubic centimeter. Orders were issued at once to confiscate all bottles, and a special announcement was made warning the public not to drink the so-called table water "La Cotorra."

### Shortage of Foodstuffs

The Cuban people are suffering from the absolute lack of flour and therefore of bread. Lard is very scarce, and costs a dollar a pound, butter is from 70 cents to a dollar a pound. The commission for food regulation is working actively in order to import flour and other articles of food and get control of them.

### Fourth National Medical Congress

The fourth meeting of the National Congress of Physicians, Dentists, Pharmacists and Veterinarians of Cuba was held last December at the Academy of Science. More than 1,200 professional men gathered, and very interesting articles were discussed. Dr. M. Dominguez of the Board of Health Laboratory for Medical Research read a paper on a new vaccine treatment of tuberculosis. Several reports were read on tropical subjects, especially on leprosy, uncinariasis and malaria, by Drs. Montoro, Lebredo and Alfonso.

Dr. J. A. Presno, professor of anatomy of the University of Havana and a prominent surgeon, was elected chairman of the fifth meeting of the medical congress, to be held in 1920.

### Award of Prize

The biannual prize of the Society of Clinical Studies was awarded to Dr. E. de Aragon, Jr., for his studies on cancer of the uterus. The prize consists of $200 and a diploma.

### Vaccination Against Smallpox

One case of smallpox was diagnosed on board a ship from New Orleans at Havana harbor; the patient was removed to Las Animas Hospital for contagious diseases. Shortly afterward another case of smallpox was discovered in the city, and the patient removed to the same hospital. Compulsory vaccination has been ordered, and so far no more cases of the disease have been registered.

## *Marriages*

SURG. LAWRENCE FLOYD DRUMM, U. S. Navy, on duty in the Public Health Service in Hayti, to Miss Harriet May Randall of Oneida, N. Y., at Port-au-Prince, Hayti, January 17.

LIEUT. THOMAS JOSEPH COURTNEY, Assistant Surgeon, U. S. Navy, Brookline, Mass., to Miss Teresa Bernardine Killelea of Worcester, Mass., February 12.

LIEUT. JAMES PATRICK FITZGERALD, M.D., M. R. C., U. S. Army, New York City, to Miss Katherine Dean of Highland Park, Ill., February 9.

LIEUT. ROLAND ALBERT DAVISON, M.D., M. R. C., U. S. Army, to Miss Florence James of Brooklyn, at Malone, N. Y., December 30.

ASST. SURG. WALTER JAMES SPENCER, U. S. Navy, Brooklyn, to Miss Sophia Burgauer of Chicago, in New York City, December 24.

LIEUT. HARRY ANTHONY DURKIN, M.D., M. R. C., U. S. Army, to Miss Rose M. Fleming, both of Peoria, Ill., February 1.

LIEUT. CHARLES MALLON O'CONNOR, JR., M. C., U. S. Army, to Miss Marie Ballentyne of Honolulu, H. I., December 21.

HOWARD CLAY SEVIER, M.D., Tallulah, La., to Miss Clyde Kell Scott of Vicksburg, Miss., January 12.

GEORGE PITKIN COOLEY, JR., M.D., Detroit, to Miss Bessie B. Leipz of Evanston, Ill., January 12.

HUNTER ROBB, M.D., Winchester, Mass., to Mrs. Edwin Ginn of Boston, February 2.

FLOYD ALBERT SMITH, M.D., to Miss Edna H. McCann, both of Canton, Ill., January 1.

## Deaths

**Samuel Augustine Brown, M.D.,** Sioux Falls, S. D.; Jefferson Medical College, 1871; aged 69; a Fellow of the American Medical Association; first president of the Sioux Valley Medical Association; first president of the South Dakota State Medical Association, and of the Minnehaha County Medical Society, and Seventh District Medical Society; assistant surgeon in the United States Navy from 1871 to 1884; died at his home, February 5, from heart disease. The Seventh District Medical Society at its regular monthly session adopted resolutions of affection, appreciation and regret.

**Capt. Milton Jay Lichty, M.D.,** M. R. C., U. S. Army, Cleveland; University of Pennsylvania, Philadelphia, 1895; aged 48; a Fellow of the American Medical Association; a member of the Cleveland Academy of Medicine; assistant clinical professor of medicine in Western Reserve University, Cleveland; chairman of the board of tuberculosis examiners at Camp Zachary Taylor, Louisville, Ky.; died in the base hospital at Camp Taylor, February 14, from septic meningitis following an otitis media and mastoid operation.

**Robert Folger Stratton, M.D.,** St. Joseph, Mich.; Harvard Medical School, 1857; aged 86; for more than fifty years a resident of St. Joseph, for many years school moderator, and a member of the board of education; at one time library trustee, a member of the city council, and of the board of health; surgeon of the Eleventh Illinois Volunteer Cavalry during the Civil War; died at his home, February 7, from myocarditis.

**William Chilton Day, M.D.,** Danville, Va.; Medical College of Virginia, Richmond, 1864; aged 76; a member of the Medical Society of Virginia; surgeon in the Confederate service throughout the Civil War; for thirty-five years local surgeon of the Southern Railway, and president of the Society of Southern Railway Surgeons in 1915; died in the Danville General Hospital, January 25, from pneumonia.

**Capt. Clarence Davis Bradley, M.D., M. R. C., U. S. Army,** Philadelphia; University of Pennsylvania, Philadelphia, 1907; aged 38; a Fellow of the American Medical Association; instructor in laryngology in Temple University, and a member of the staff of the Samaritan Hospital; regimental surgeon of the Sixty-Ninth Infantry, U. S. Army; died at Camp Greene, Charlotte, N. C., February 1.

**Milton H. Auter, M.D.,** Galesburg, Ill.; Howard University, Washington, D. C., 1905; aged 38; a colored practitioner; formerly a Fellow of the American Medical Association; a member of the Illinois State Medical Society; died at the home of his father at Harrisburg, Pa., January 17, from the effects of a gunshot wound of the heart, self-inflicted, it is believed, with suicidal intent.

**Ernest Frederick Luhrsen, M.D.,** Brooklyn; Long Island College Hospital, Brooklyn, 1889; aged 42; a Fellow of the American Medical Association; pathologist and assistant surgeon to the Lutheran Hospital, Brooklyn; formerly lecturer in toxicology in the Brooklyn College of Pharmacy; a member of the staff of the Brooklyn Hospital; died at his home, February 3, from pneumonia.

**Wilfrid Warpool Brown, M.D.,** Woonsocket, R. I.; Baltimore Medical College, 1891; aged 52; a Fellow of the American Medical Association, and president of the Woonsocket District Medical Society; superintendent of the Blackstone, Mass., public schools, and a member of the school board for three years; a member of the Woonsocket school committee; died at his home, January 28.

Died in the Service

LIEUT. FRANCIS FINDLEY HANBIDGE, M.D., M. R. C., U. S. ARMY

(See The Journal, Feb. 16, p. 477)

**William T. Pate, M.D.,** Gibson, N. C.; College of Physicians and Surgeons, Baltimore, 1885; aged 57; formerly a Fellow of the American Medical Association; a member of the Medical Society of the State of North Carolina; formerly state bacteriologist and president of the Fifth District Medical Society; died at his home, Dec. 3, 1917, from cerebral hemorrhage.

**Henry A. Smith, M.D.,** Waterville, Wash.; Lincoln Memorial University, Knoxville, Tenn., 1892; aged 49; formerly a member of the Washington State Medical Association; died in a hospital in Waterville, February 2, from the effects of poison self-administered and an incised wound of the throat, self-inflicted, it is believed, with suicidal intent.

**Henry B. Stehman, M.D.,** Pasadena, Calif.; Jefferson Medical College, 1877; aged 65; a Fellow of the American Medical Association, and Chicago Gynecological Society; for many years superintendent of the Presbyterian Hospital, Chicago; who was obliged to go to California on account of his health in 1900, died at his home, February 17.

**Murray Hume Paterson, M.D.,** R. A. M. C., Chatham, Ont.; University of Toronto, 1914; aged 26; for two years on duty as medical officer of the First Rifle Brigade, and awarded the Military Cross for rescuing wounded under fire; was struck by an express train and instantly killed near Orpington, Kent, England, September 14.

**Robert Emmett Griffin, M.D.,** Lincoln, Neb.; Bellevue Hospital Medical College, 1880; aged 58; major and chief surgeon of United States Volunteers during the war with Spain, and surgeon-general of Nebraska National Guard; surgeon-in-chief to St. Elizabeth's Hospital, Lincoln; died in a hospital in that city, February 15.

**Major Henri Masson Duhamel, M.D.,** Montreal; Laval University, Montreal and Quebec, 1890; aged 51; one of the first to take service with Laval General Hospital No. 6, C. E. F., serving with the hospital in England and France since 1916; who was invalided home in December last, died at his home, February 3.

**Harry Bower Tice, M.D.,** Twodot, Mont.; University and Bellevue Hospital Medical College, New York City, 1899; aged 42; secretary of the Meagher County, Mont., Board of Health from 1904 to 1910; surgeon to the Montana Railroad; died at the Daughters of Jesus Hospital, Lewistown, January 31, from pneumonia.

**Lieut. Ellsworth Josiah Carroll, M.D., M. R. C., U. S. Army,** Eureka, Ill.; College of Physicians and Surgeons, Keokuk, Iowa, 1889; aged 53; who was on active service on duty at Camp McArthur, Waco, Texas, and attached to the aero squadron; died at Camp McArthur, February 13, from spinal meningitis.

**George Burnham, M.D.,** Peterboro, Ont.; Bellevue Hospital Medical College, 1866; University of Victoria College, Coburg, Ont., 1867; aged 73; for twenty-five years a member of the board of education of Peterboro, and for two years its chairman; died at his home, Nov. 27, 1917, from cerebral hemorrhage.

**William Stewart Keever, M.D.,** Parkersburg, W. Va.; Medical College of Ohio, Cincinnati, 1884; aged 56; formerly a member of the West Virginia State Medical Association; a charter member of the Ohio Valley Medical Society; died in St. Joseph's Hospital, Parkersburg, February 3.

**William Ilderton, M.D.,** Florence, S. C.; Medical College of the State of South Carolina, 1889; aged 54; formerly a Fellow of the American Medical Association; was shot and killed in a pistol duel in the county court house, February 8.

**Alexander Cameron Brown, M.D.,** Lexington, Ky.; Hospital College of Medicine, Louisville, Ky., 1904; aged 38:

formerly a Fellow of the American Medical Association; a member of the Kentucky State Medical Association; died at his home, February 6, from pneumonia.

**Charles Dexter Sawin, M.D.,** Somerville, Mass.; Harvard Medical School, 1883; aged 60; a Fellow of the American Medical Association; from 1884 to 1890 physician to the state prison, Charlestown, Mass.; died suddenly from heart disease in Boston, February 8.

**Thomas L. Irwin, M.D.,** Jacksonville, Fla.; Cincinnati College of Medicine and Surgery, 1865; aged 81; a pioneer pharmacist of Jacksonville, and a member of the city council; died at the home of his son in Jacksonville, January 25, from pneumonia.

**P. Joseph Faughnan, M.D.,** Locust Gap, Pa.; College of Physicians and Surgeons, Baltimore, 1892; aged 53; a member of the Medical Society of the State of Pennsylvania; died at his home, January 28, from heart disease.

**John Martin Craig, M.D.,** Philadelphia; University of Michigan, Ann Arbor, 1898; aged 55; a Fellow of the American Medical Association; died at his home in Germantown, Philadelphia, December 26, from pneumonia.

**Olenthus D. Stroud,** Ore Hill, N. C. (license, North Carolina, 1885); aged 67; a member of the Medical Society of the State of North Carolina; also a druggist; died in a hospital in Greensboro, N. C., January 19.

**Edmund A. Maisch, M.D.,** Victoria, Texas; Memphis (Tenn.) Hospital Medical College, 1893; aged 49; a Fellow of the American Medical Association; died at his home, January 28, from pneumonia.

**Albert Summerfield Payne, M.D.,** Manistee, Mich.; University of Michigan, Ann Arbor, 1892; aged 49; a Fellow of the American Medical Association; died at his home, January 31, from heart disease.

**Thomas A. Lilly, M.D.,** Chicago; Kentucky School of Medicine, Louisville, 1864; aged 80; physician to Sacred Heart Convent and St. Joseph's Home, Chicago; died at his home, February 6.

**William Stanley Gorsuch, M.D.,** Baltimore; University of Maryland, Baltimore, 1888; aged 55; for many years a practitioner of Churchville, Md.; died at his home, January 23.

**Patrick J. Cassidy, M.D.,** Norwich, Conn.; Johns Hopkins University, Baltimore, 1898; aged 43; a Fellow of the American Medical Association; died at his home, January 28.

**Lieut. Arnold Herbert Van Duyn, M.D., M. R. C., U. S. Army,** Hill City, Kan.; College of Physicians and Surgeons, Chicago, 1893; aged 46; died at his home, January 28, from heart disease.

**Charles T. Moorman, M.D.,** Packwood, Iowa; Eclectic Medical Institute, Cincinnati, 1876; aged 81; a practitioner for more than forty-four years; died at his home, February 4.

**Walter R. Bartlett, M.D.,** Greenwich, N. Y., Yale University, New Haven, Conn., 1871; aged 79; a veteran of the Civil War; died at his home, January 13, from pneumonia.

**Peter Anderson, M.D.,** New York City; University of Toronto, Ont., 1903; aged 39; died in the Kingston Avenue Hospital, Brooklyn, January 30, from tuberculosis.

**Samuel Brubaker Hartman, M.D.,** Columbus, Ohio; Jefferson Medical College, 1857; aged 87; died in the Hotel Hartman, Columbus, January 30, from senile debility.

**Judson Teeter, M.D.,** New Salem, Ohio; Medical College of Ohio, Cincinnati, 1902; aged 40; formerly of Pleasant Hill, Ohio; died at his home, January 15, from asthma.

**Edward Pollock Anshutz, M.D.,** Philadelphia; Hering Medical College (Hon.), 1909; aged 71; editor of the *Homeopathic Recorder;* died at his home, January 31.

**James Fielding, M.D.,** Norwich, England; Victoria College, Coburg, Ont., 1868; aged 73; formerly of Bowmanville, Ont.; died at his home, recently.

**William S. Wilson, M.D.,** Maysville, Ga.; Georgia College of Eclectic Medicine and Surgery, Atlanta, 1891; aged 55; died at his home, January 27, from acute gastritis.

**B. H. Yount, M.D.,** Wilbur, Wash.; Baltimore University, 1889; aged 60; a pioneer practitioner of the Big Bend Region; died, about January 21.

**William Clark Leet, M.D.,** Washington, Pa.; College of Physicians and Surgeons, Baltimore, 1881; aged 80; died at his home, January 30.

**Mary Eva Peck, M.D.,** Goshen, Ind.; Hahnemann Medical College, Chicago, 1889; aged 65; died at her home, January 27, from neuritis.

# *The Propaganda for Reform*

IN THIS DEPARTMENT APPEAR REPORTS OF THE COUNCIL ON PHARMACY AND CHEMISTRY AND OF THE ASSOCIATION LABORATORY, TOGETHER WITH OTHER MATTER TENDING TO AID INTELLIGENT PRESCRIBING AND TO OPPOSE MEDICAL FRAUD ON THE PUBLIC AND ON THE PROFESSION

## BELL-ANS (PAPAYANS, BELL)

### As the New York Tribune's "Ad-Visor" Sees It

"Why avoid draughts? Sit by an open window, if you want to! Just take a few drops of Sneeze-o before you go into the draught and after you come out of it, and you'll never catch cold.

"Don't be afraid of contagion. Kiss your Uncle Ebenezer, even if he's dying of tuberculosis! Just fortify yourself with a sip of Lungicide before you go to his bedside, and another when you come away, and you'll be taking no risk.

"Are you going to sit there and let the other folks eat up all the good things just because you are afraid to pitch in, when 2 or 3 Bell-Ans taken before and after the meal would enable you to enjoy your share of all that's coming without a bit of discomfort or distress? Bell-Ans has restored the pleasures of the table to thousands who say: 'I can now eat anything and plenty of it, too.'"

"The first two blurbs are The Ad-Visor's. The third is a bona fide advertisement of Bell-Ans, aimed to catch the holiday trade. They are all patterned after the same style and the first two are no more lacking in logic than the last. Overeat—deliberately court indigestion—invite gout—don't be a gourmet, be a gourmand—be an anti-Hoover and eat a lot of food, whether you need it or not; then take Bell-Ans. If it doesn't 'absolutely remove indigestion,' your druggist will give you back your money! Could anything be fairer than that?

"Such copy as this is not limited in its evil effects to the misguided individual who eats lobster and ice cream at midnight and trusts to Bell-Ans to atone for his indiscretion. The most serious effect of such reckless advice is the example which the advertising sets to other advertisers."

The comments just quoted are from the Ad-Visor department of the New York *Tribune* of Feb. 7, 1918. They are respectfully referred to the *New York Medical Journal*, the *International Journal of Surgery* and the *Woman's Medical Journal*—three presumably scientific publications that through their advertising pages urge physicians to prescribe Bell-Ans.

## ANTIPHLOGISTINE

*To the Editor:*—Last September, my chief, Dr. J. S. Millard, received a letter from the Denver Chemical Mfg. Co., manufacturers of "Antiphlogistine." This letter purported to quote many large commercial concerns as testifying to the value of Antiphlogistine. Recently, I doubted the veracity of these claims and wrote to some of those quoted. I quote from the original letter of the Antiphlogistine company:

"The surgeon to the electric light and electric railroad company in New Orleans, says that Antiphlogistine is the finest thing he has ever used in burns, especially flash and brush burns.

"The physician to the New York Edison Co. makes a similar statement. He says that the application gives speedy relief and the burns heal quickly without scars."

I wrote to Dr. John Woodman, the physician to the New York Edison Co., who replied in part as follows:

"The Denver Chemical Manufacturing Company have no authority to quote me. . . . I gave Antiphlogistine a thorough trial, and found it had a very limited use, and I cannot recommend it for burns. . . ."

Again, the Antiphlogistine letter said:

"It may be of interest to you to know that at the emergency hospital of the Ford Automobile Co. in Detroit, Antiphlogistine is carried in stock and is used extensively by the three physicians in burns, bruises, infected wounds, sprains and other traumatic conditions which are constantly arising in such a plant. . . ."

I wrote to Dr. Mead who replied as follows:

"In answer to your letter of January 25th, will state that no Antiphlogistine has been purchased or used in this hospital for years past,

and I cannot imagine why the representative of the Denver Chemical Company should make such a statement as attributed to him. . . ."

He adds that "Antiphlogistine has never been used" in his department "on an open wound, abrasion or burn." Is there not some way that such exploitation of our large companies can be prevented?

A. G. Gould, M.D., Akron, Ohio.
Plant Physician, the Goodyear Tire & Rubber Co.

## Correspondence

### CARDIOVASCULAR EXAMINATIONS

*To the Editor:* The interesting and suggestive article by Dr. Babcock in The Journal, February 9, raises questions that demanded critical consideration at the present time.

All competent clinicians, military surgeons and life insurance medical directors will, I am sure, heartily concur in Dr. Babcock's postulate that even a persistent heart murmur unaccompanied by any secondary symptoms or signs is not sufficient ground for condemning a man to an early death. Those who have had an opportunity to observe and statistically follow large masses of lives presenting such impairment will go even further and agree that a fair number of individuals exhibiting unquestionably grave organic impairment of heart and kidney will live for many years and that some will arrive at a ripe old age. Such individual instances, however, only expose the folly of regarding organic physical impairment as necessarily a progressive disease entity or "malady" that inevitably moves on in its mysterious course rapidly to shorten life.

A damaged or imperfect heart is not a condition of *disease* but of *impairment;* and with proper care and attention to the source of impairment (infectious, toxic, etc.) or with unusual luck and latent resisting power the damaged organ may be made to "carry on" more or less indefinitely. This does not, however, convict the life insurance officers or military surgeons of inconsistency in declining, or rating up, men with heart murmurs that have been adjudged to be either organic or of doubtful significance.

The life insurance officers and others who have to consider the ultimate quality of an accumulated group of lives must distinctly avoid being governed by individual instances of the types cited by Dr. Babcock.

No weight of clinical judgment based on the consideration of comparatively small numbers of lives which have not been rigorously followed over long years of exposure to life strain and compared with normal lives can be accepted as against the cold-blooded testimony of the mortality records. It is a curious and significant fact that the life insurance mortality on cases reported to have functional heart signs only, but limited to rated up policies because of the doubtful diagnosis, was for a time as heavy as that on well defined valvular murmurs. With the improvement in diagnosis, the so-called functional heart murmurs or murmurs that cannot be classified under the characteristic valvular murmurs show in certain well tested experiences about 50 per cent. extra mortality.

Characteristic types of so-called valvular murmur give death rates ranging from 50 per cent. extra mortality to over 100 per cent.; and it is to be remembered that these figures relate to cases that are free from subjective symptoms—supposedly favorable types! The mortality in cases showing decompensation and obvious signs of even slight circulatory failure would be much higher. Such cases are not usually accepted even for substandard policies. One large company that has accepted a considerable number of substandard lives on rated up premiums has had approximately a double mortality in these heart cases, in spite of the fact that none is accepted over the age of 40, no cases of aortic murmur are accepted, and all cases must be apparently in good functional condition.

In the medico-actuarial investigation of the experience of forty-three life insurance companies, a persistently irregular pulse showed an extra mortality of 50 per cent. in lives accepted on standard policies. A pulse rate of from 90 to 100 showed an extra mortality of 72 per cent. in lives accepted on standard policies.

These are stubborn facts, and they amply justify the conservatism of the life insurance companies. They may well be considered by the military authorities at the present time, when clinical judgment is determining a very liberal attitude, both here and in England, toward circulatory impairment. That murmurs may be caused by conditions other than valvular impairment only emphasizes the need for caution in interpreting their significance too optimistically. If the wealth of evidence locked up in British life offices were available, perhaps Sir James Mackenzie would not be so ready to send heart patients back to active service (except as an extreme military necessity).

The writings of this brilliant worker in heart pathology, to whom we owe so much, are strongly tinctured with this optimistic note in prognosis. He says:

> The possibility that a healthy heart may present a murmur is so opposed to the views of a great many of the profession, teachers and practitioners, that much harm is done to people who have to be examined for life insurance or for entrance into the services. I base my views on the fact that I have watched numbers of healthy young people, who exhibited this murmur, grow up into manhood and womanhood, and lead healthy and vigorous lives, and never show the slightest sign of heart failure.

When fixing the quality and vitality of a class or group, "numbers" too loosely considered will not do; we must accept the evidence of the complete records, the ascertained mortality on the group as against the survival of a fortunate few.

The unquestionably high mortality in this class justifies the penalizing of these lives, while the survival of large numbers also justifies a hopeful outlook if they are properly safeguarded, which is not the case if they are slapped on the back and told to go about their business and pay no heed to their limitations.

This is a time when action should be based on evidence whenever it is obtainable. It would be, indeed, a calamity if the present trend toward minimizing the importance of these clinical heart findings should lead to a faulty attitude on the part of the profession toward circulatory impairment.

It is well to know that organic impairment need not be rapidly progressive. It is equally important to know that, on the average, it definitely shortens life even in apparently favorable types, and emphasizes the need for hygienic living among those showing persistent heart irregularities or murmurs.

We may well take heed lest there be turned back into civil life, after the war is over, an unduly large number of damaged men. Men who now show an extra mortality of from 50 to 100 per cent. under ordinary life strain are not likely to be improved under war strain, even though at the outset the camp training is temporarily beneficial.

It is well known that the effect of emotional strain may be more harmful than physical strain to the circulation.

Some with heart signs will undoubtedly be permanently benefited by the war, but it is the mass we have to consider and not the exceptional individual. It is lack of this mass or group consideration that is liable to lead to serious error at the present time.

Eugene L. Fisk, M.D., New York.

### FEDERAL TRADE COMMISSION REQUESTS USE OF OFFICIAL NAMES

*To the Editor:*—Nothing is further from the intention of this commission than to attempt to influence the editorial or advertising policy of any publication, but it is believed that an effort should be made to secure the general use of the new official names in connection with the drugs, licenses to manufacture which have been granted by this commission. To this end we suggest that The Journal of the American Medical Association (if such course meets its approval) use the official names "Arsphenamine," "Procaine," "Barbital," etc., in connection with all advertisements of the products and all articles in which they are referred to.

L. L. Bracken, Washington, D. C.
Secretary, Federal Trade Commission.

## Queries and Minor Notes

ANONYMOUS COMMUNICATIONS and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted, on request.

### SYPHILODOL

*To the Council on Pharmacy and Chemistry:*—If you have not already done so, will you kindly examine and report on "Syphilodol" advertised in the enclosed pamphlet? B. C. PEDERSEN, M.D., New York.

*To the Editor:*—Have you any information concerning the enclosed half page advertisement [of Syphilodol] from the *Urologic and Cutaneous Review?* EDWARD S. NEWELL, M.D., Pelham, N. Y.

*To the Editor:*—I am enclosing an advertisement for a substance called "Syphilodol" manufactured in New York. I am not familiar with this article nor have I seen it advertised in the higher class journals. Can you tell me whether THE JOURNAL's department of New and Nonofficial Remedies has passed on this article or whether you have any data concerning it? It looks a trifle fishy to me.
LOUIS LEBOY, M.D., Memphis, Tenn.

*To the Editor:*—I am sending the enclosed correspondence [Syphilodol letters] to you as it looks as if it might have some interesting features from the point of view of your nostrum department.
ISADORE DYER, New Orleans, La.

ANSWER.—These are but some of the inquiries that have been received on this subject and it is encouraging to note the scientifically critical attitude of physicians toward new therapeutic agents. According to the French Medicinal Company, Inc., which markets this product, "Syphilodol is a synthetic chemical product of silver, arsenic and antimony. . . ." Nowhere in the advertising matter is there any more definite statement as to the composition of this new "synthetic" than that just quoted. The product is now under examination in the Association's laboratory and when this is completed a more detailed report will doubtless be forthcoming. At present the work has progressed sufficiently to show that Syphilodol tablets contain considerable quantities of mercury! Although the advertising leaflets claim that the preparation is "the formula of the late Dr. Alfred Fournier of Paris" and had been exhaustively tested by Metchnikoff who is alleged to have found it superior to Salvarsan and Neosalvarsan, yet, strange to say, a careful search of French medical journals fails to show any reports on Syphilodol. *Verb. sap.*

### TROUSSEAU'S WINE—PYXOL

*To the Editor:* 1. Will you please give me the old formula of Trousseau's Wine? How is it prepared; are leaves and berries or powder, i. e., drugs, used? 2. What is pyxol, which is used in the preparation of McDonald's solution?
A. P. UTTERBACK, M.D., Ozona, Texas.

ANSWER—1. The obsolete and irrational combination of drugs acting on the heart and kidneys known as Trousseau's wine (Vin de digitale composé) is made by macerating digitalis, 10 gm., squill, 15 gm., and juniper berries, 150 gm., with white wine, 1,800 gm., and alcohol (90 per cent.), 200 gm. After maceration the liquid is expressed, 100 gm. of potassium acetate dissolved in it, and the liquid filtered.

2. Pyxol is a preparation somewhat similar to the compound solution of cresol of the U. S. Pharmacopeia. It is a proprietary preparation of secret composition. In 1915 Pyxol was declared misbranded under the Insecticide Act (U. S. Dept. of Agric., Service and Regulatory Announcements, No. 10).

### LUMINAL

*To the Editor:*—I wish to know something of Luminal. I have a patient who had it prescribed for him by a Chicago physician. I can find numerous references to it, but can find nothing in regard to its composition or actions. N. L. GOODRICH, M.D., South Haven, Mich.

ANSWER.—Luminal is described in New and Nonofficial Remedies, 1917, p. 87-88. Chemically it is phenyl-ethyl-barbituric acid, and differs from veronal (diethylbarbituric acid) in that one ethyl group has been replaced by a phenyl group. Luminal is claimed to be a useful hypnotic in nervous insomnia and conditions of excitement of the nervous system.

## Medical Education and State Boards of Registration

### COMING EXAMINATIONS

ALASKA: Juneau, March 5. Sec., Dr. L. P. Dawes.
COLORADO: Denver, April 2. Sec., Dr. David A. Strickler, 612 Empire Bldg., Denver.
CONNECTICUT: New Haven, March 12-13. Sec., Dr. Charles A. Tuttle, New Haven.
CONNECTICUT (H): New Haven, March 12. Sec., Dr. E. C. M. Hall, 82 Grand Ave., New Haven, Conn.
IDAHO: Pocatello, April 2-3. Sec., Dr. Ray H. Fisher, Rigly.
MAINE: Portland, March 12-13. Sec., Dr. Frank W. Searle, 776 Congress St., Portland.
MASSACHUSETTS: Boston, March 12-14. Sec., Dr. Walter P. Bowers, Room 501, No. 1 Beacon St., Boston.
MINNESOTA: Minneapolis, April 2-4. Sec., Dr. Thos. McDavitt, 741 Lowry Bldg., St. Paul.
MISSOURI: St. Louis, March 19-21. Sec., Dr. George H. Jones, Capitol Bldg., Jefferson City.
MONTANA: Helena, April 2. Sec., Dr. S. A. Cooney, 205 Power Bldg., Helena.
NEW MEXICO: Santa Fe, April 8. Sec., Dr. R. K. McClanahan, East Las Vegas.
OKLAHOMA: Oklahoma City, April 9-10. Sec., Dr. J. J. Williams, Weatherford.
RHODE ISLAND: Providence, April 4-5. Sec., Dr. B. U. Richards, State House, Providence.
UTAH: Salt Lake City, April 1-2. Sec., Dr. G. F. Harding, 407 Templeton Bldg., Salt Lake City.

### FINAL REPORT ON EDUCATION PRELIMINARY TO THE STUDY OF MEDICINE

The highest desirable legal standard of preliminary education advocated by the American Medical Association as the minimum for admission to the study of medicine is two years of college work based on a four-year high school education. In June, 1916, this standard had been adopted by the majority of medical schools in the United States, and in that month was made a requisite for the Class A rating of the Council on Medical Education. Prior to that time, and since Jan. 1, 1914, the requirement was one year of college work, including required courses, of eight semester hours each, in physics, chemistry and biology. In February, 1917, a special committee was appointed by the Council on Medical Education to study the problem of premedical education, to suggest a subject content of the two-year premedical college course, and to develop a schedule of the subjects which would best prepare the student for his subsequent medical studies.

The committee is made up as follows:

Dr. Kendrick C. Babcock, Urbana, Ill., chairman, formerly specialist in higher education of the United States Bureau of Education; now dean of the College of Liberal Arts and Sciences of the University of Illinois and intimately identified with the work of the North Central Association of Colleges and Secondary Schools and the Association of American Universities in standardizing colleges of arts and sciences.

Prof. George Gailey Chambers, director of admissions, University of Pennsylvania, Philadelphia, representing the Association of American Universities.

Dr. W. F. R. Phillips, professor of anatomy of the Medical College of the State of South Carolina, Charleston, representing the Association of American Medical Colleges.

Dr. Theodore Hough, dean of the University of Virginia Department of Medicine, Charlottesville.

Dr. N. P. Colwell, secretary of the Council on Medical Education of the American Medical Association, Chicago.

Although of great importance to medical education, this is a matter which chiefly concerns academic colleges and universities; and for that reason, associations of such colleges are represented on the committee. Presidents and deans of such colleges have been generally and freely consulted in the study of the problem. The preliminary report of this special committee was published in THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, Aug. 18, 1917, page 546.

Following the discussions at the annual conferences of the Council on Medical Education and the Association of American Colleges in Chicago, Feb. 4 and 5, 1918, the committee met and prepared its final report, which, as finally adopted, is as follows:

#### I. High School Requirements

(*a*) For admission to the two-year premedical college course, students shall have completed a four-year course of at least fourteen units (fifteen after Jan. 1, 1920) in a standard accredited high school or other institution of standard

secondary school grade, or have the equivalent as demonstrated by examinations conducted by the College Entrance Examination Board, or by the authorized examiner of a standard college or university which has been approved by the Council on Medical Education. Unless all the entrance units are obtained by examination, a detailed statement of attendance at the secondary school, and a transcript of the student's work, should be kept on file by the college authorities. This evidence of actual attendance at the secondary schools should be obtained, no matter whether the student is admitted to the freshman or to higher classes.

(*b*) Credits for admission to the premedical college course may be granted for the subjects shown in the following list and for any other subject counted by a standard accredited high school as a part of the requirements for its diploma, provided that at least eleven units must be offered in Groups I-V:

SCHEDULE OF SUBJECTS REQUIRED OR ACCEPTED FOR ENTRANCE TO THE PREMEDICAL COLLEGE COURSE

| Subjects | Units* | Required |
|---|---|---|
| GROUP I, ENGLISH— | | |
| Literature and composition | 3-4 | 3 |
| GROUP II, FOREIGN LANGUAGES— | | |
| Latin | 1-4 | 2† |
| Greek | 1-3 | |
| French or German | 1-4 | |
| Other foreign languages | 1-4 | |
| GROUP III, MATHEMATICS— | | |
| Elementary algebra | 1 | 1 |
| Advanced algebra | ½-1 | .. |
| Plane geometry | 1 | 1 |
| Solid geometry | ½ | .. |
| Trigonometry | ½ | .. |
| GROUP IV, HISTORY— | | |
| Ancient history | ½-1 | 1 |
| Medieval and modern history | ½-1 | |
| English history | ½-1 | |
| American history | ½-1 | |
| Civil government | ½-1 | |
| GROUP V, SCIENCE— | | |
| Botany | ½-1 | .. |
| Zoology | ½-1 | .. |
| Chemistry | 1 | .. |
| Physics | 1 | .. |
| Physiography | ½-1 | .. |
| Physiology | ½-1 | .. |
| Astronomy | ½ | .. |
| Geology | ½-1 | .. |
| GROUP VI, MISCELLANEOUS— | | |
| Agriculture | 1-2 | .. |
| Bookkeeping | ½-1 | .. |
| Business law | ½-1 | .. |
| Commercial geography | ½-1 | .. |
| Domestic science | 1-2 | .. |
| Drawing, freehand and mechanical | ½-2 | .. |
| Economics and economic history | ½-1 | .. |
| Manual training | 1-2 | .. |
| Music: Appreciation or harmony | 1-2 | .. |

* A unit is the credit value of at least thirty-six weeks' work of four or five recitation periods per week, each recitation period to be not less than forty minutes. In other words, a unit represents a year's study in any subject in a secondary school constituting approximately a quarter of a full year's work. A satisfactory year's work in any subject cannot be accomplished under ordinary circumstances in less than 120 sixty-minute hours, or their equivalent.

† Both of the required units of foreign language must be of the same language, but the two units may be presented in any one of the languages specified.

Of the fourteen units of high school work, (fifteen after Jan. 1, 1920) eight units are required, as indicated in the foregoing schedule; the balance may be made up from any of the other subjects in the schedule.

## II. Premedical College Course

(*c*) Beginning Jan. 1, 1918, the minimum requirement for admission to acceptable medical schools, in addition to the high school work specified above, will be sixty semester hours of collegiate work, extending through two years, of thirty-two weeks each, exclusive of holidays, in a college approved by the Council on Medical Education. The subjects included in the two years of college work should be in accordance with the following schedule:

SCHEDULE OF SUBJECTS OF THE TWO-YEAR PREMEDICAL COLLEGE COURSE

Sixty Semester Hours* Required

| Required Subjects: | Semester Hours |
|---|---|
| Chemistry (a) | 12 |
| Physics (b) | 8 |
| Biology (c) | 8 |
| English composition and literature (d) | 6 |
| Other nonscience subjects (e) | 12 |
| **Subjects Strongly Urged:** | |
| French or German (f) | 6-12 |
| Advanced botany or advanced zoology | 3-6 |
| Psychology | 3-6 |
| Advanced mathematics including algebra and trigonometry | 3-6 |
| Additional courses in chemistry | 3-6 |
| **Other Suggested Electives:** | |
| English (additional), economics, history, sociology, political science, logic, mathematics, Latin, Greek, drawing. | |

* A semester hour is the credit value of sixteen weeks' work consisting of one lecture or recitation period per week, each period to be not less than fifty minutes net, at least two hours of laboratory work to be considered as the equivalent of one lecture or recitation period.

### SUGGESTIONS REGARDING INDIVIDUAL SUBJECTS

(*a*) *Chemistry.*—Eight semester hours required (twelve after Jan. 1, 1919) of which at least eight semester hours must be in general inorganic chemistry, including four semester hours of laboratory work. In the interpretation of this rule work in qualitative analysis may be counted as general inorganic chemistry. The remaining four semester hours (required after Jan. 1, 1919) may consist of additional work in general chemistry or of work in analytic or organic chemistry.

(*b*) *Physics.*—Eight semester hours required, of which four must consist of laboratory work. It is urged that this course be preceded by a course in trigonometry. This requirement may be satisfied by six semester hours of college physics, of which two must be laboratory work, if preceded by a year (one unit) of high school physics.

(*c*) *Biology.*—Eight semester hours required, of which four must consist of laboratory work. This requirement may be satisfied by a course of eight semester hours in either general biology or zoology, or by courses of four semester hours each in zoology and botany, but not by botany alone.

(*d*) *English Composition and Literature.*—The usual introductory college course of six semester hours, or its equivalent, is required.

(*e*) *Nonscience Subjects.*—Of the sixty semester hours required as the measurement of two years of college work, at least eighteen, including the six semester hours of English, should be in subjects other than the physical, chemical or biologic sciences.

(*f*) *French or German.*—A reading knowledge of one of these languages is strongly urged. If the reading knowledge in one of these languages is obtained on the basis of high school work, the student is urged to take the other language in his college course. It is not considered advisable, however, to spend more than twelve of the required sixty semester hours on foreign languages. In case a reading knowledge of one language is obtained by six semester hours of college work, another six semester hours may be well spent in taking the beginner's course in the other language; if this is followed up by a systematic reading of scientific prose, a reading knowledge of the second language may be readily acquired. When a student spends more than two years in college he may well spend twelve semester hours of his college work in the second language.

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## Advances Proposed at Columbia University School of Medicine

Columbia University School of Medicine is proposing the addition of a fifth year to the curriculum, to be spent by the student as an intern in a hospital. The reasons given for this are, first, the overcrowded condition of the curriculum and, second, the fact that a number of states now require the completion of an internship before candidates will be permitted to take the examination for license. The plans suggest that the degree of bachelor of medicine may be granted on completion of the present four-year course, and that the M.D. degree be withheld until after the internship has been completed. It is also proposed to have this intern year under the supervision of the medical faculty, so that the work of each intern will be carefully directed, in order that he may obtain as profitable an experience as possible. Other students who obtain the degree of bachelor of medicine, but who do not wish to enter on the practice of medicine, instead of taking the intern year may substitute advanced courses in research and laboratory subjects, and prepare themselves for the degree of master of science, or of doctor of philosophy.

# Book Notices

NEUROSYPHILIS: MODERN SYSTEMATIC DIAGNOSIS AND TREATMENT PRESENTED IN ONE HUNDRED AND THIRTY-SEVEN CASE HISTORIES. By E. E. Southard, M.D., Sc.D., Bullard Professor of Neuropathology, Harvard Medical School, and H. C. Solomon, M.D., Instructor in Neuropathology and in Psychiatry, Harvard Medical School. With an Introduction by James Jackson Putnam, M.D., Professor Emeritus of Diseases of the Nervous System, Harvard Medical School. By Vote of the Trustees of the Boston State Hospital, Monograph Number Two of the Psychopathic Hospital, Boston, Mass. Cloth. Price, $5. Pp. 496, with 25 illustrations. Boston: W. M. Leopard, 1917.

"It is a privilege to be allowed to write a word of introduction to a textbook which so richly fulfils its function as does this volume on the manifold disorders classified under neurosyphilis, a subject of which the importance for the welfare of society is found to loom the larger the more deeply its mysteries are probed. The case histories with which its pages are so amply stocked are carefully analyzed in accordance with a broadly chosen plan, and the generalizations that precede and follow them are obviously based on a wide and varied personal experience such as alone could render a familiarity with the literature of the subjects treated adequate to its best usefulness." This quotation, from Dr. Putnam's admirable introduction, will be fully endorsed by those who read this book, the excellence of which has been equaled only by Nonne's "Syphilis of the Nervous System," to which the authors gracefully acknowledge an obligation which, as they say, is shared by all workers in this field. The general practitioner will find the present work more useful on account of its crisp style, concise summaries and comments, and eminently practical choice of subjects and selection of cases. Every phase is brought absolutely up to date, including an interesting discussion of the problems of neurosyphilis in relation to the war. There are seven sections, namely: (1) the nature and forms of syphilis of the nervous system; (2) the systematic diagnosis of the forms of neurosyphilis; (3) puzzles and errors in the diagnosis of neurosyphilis; (4) neurosyphilis, medicolegal and social; (5) the treatment of neurosyphilis; (6) neurosyphilis and the war; (7) summary and key.

RECOLLECTIONS OF A NEW YORK SURGEON. By Arpad G. Gerster, M.D. Cloth. Price, $3.50. Pp. 347, with illustrations. New York: Paul B. Hoeber, 1917.

Few men could write so interesting and informing a book as this, based on their own observations and experiences, because few men have had as many interesting observations and experiences. The author's early and formative years were spent in his native land, and the later in active professional life in the metropolis of the land of his adoption. In both countries, Dr. Gerster came in contact with men of note—in education, in art, in music and in medicine. And this book proves him to be not only an acute observer of men and things, but also endowed with a retentive memory. In the first part, he tells of life in Hungary—as a boy, as a student and as a young medical man. In describing his experiences he gives interesting glimpses of Hungarian life in a small town; of school life from the primary on to and including medical school days in Vienna. As the author was—and continues to be—a lover of outdoor life, and as he was often going on rambles for days or weeks at a time (sometimes, we gather, without the formal permission of his parents), we get an insight also of Hungarian rural life and of internal conditions, domestic, social and political, including charming descriptions of the country. One cannot but wish that the author had extended this part of the book. After graduating in medicine in Vienna, Dr. Gerster spent the required year as a medical officer in the Austro-Hungarian army, and his account of this year is interesting and enlightening. After this, he spent a short time in the city hospital of his home town, Casa, after which, in March, 1874, he came to this country.

The first part is autobiographical; the more recent part is in the form of comments on men and affairs in New York rather than the details of the life of the writer. Bringing with him letters of introduction from such men as Mundé, Mittleshoeffer, editor of the *Wiener medizinische Wochenschrift*, and Billroth, Dr. Gerster was not long in getting into professional life and work. The first three years he lived in Brooklyn, and then moved into New York City, where he has since resided. Naturally, affairs connected with the German and Mount Sinai hospitals and the Polyclinic, institutions with which the author was connected, receive the most attention. Naturally, also, the men connected with these institutions are the ones who are personally mentioned, since they were the ones with whom he came in close personal and professional contact.

The author entered on his professional work in this country soon after the introduction of antiseptic surgery and, as he states, was one of the first in New York to put into practice the new principle of wound treatment. It was the beginning of a new era in surgery. In his comments on his surgical work, and in his discussion of hospital management and medical schools, we are forcibly reminded of the wonderful changes that have taken place during the short span of a man's professional life. To a certain extent this part may be regarded as a history of surgery and of the developments of hospital conditions in New York City during the last half century. To New York medical men and to those who have been in close touch with medical matters in that city during the last forty years, this part will be particularly interesting.

Dr. Gerster's "Recollections" is both delightfully readable and instructive; in his comments on men and affairs, especially in those in Part 3, which is devoted to diversions—hobbies, sports and reading—the author is revealed as a man who has a broad view of things and whose life has by no means been a narrow one. The original etchings, of which there are many, also prove that the author is an artist of no mean talent.

SERVICE RHYMES. By Burt Franklin Jenness. Cloth. Price, $1. Pp. 103. El Paso: The Author, 1917.

The life of the naval surgeon is such as to bring him into contact with many phases of life, humorous, pathetic and virile. In "Service Rhymes," Dr. Jenness presents in excellent verse tales of camp and sea. Dr. Jenness shows an intimate understanding of the heart of the rookie either in the barracks or in the "fo'c's'le." Here is a sample:

When a fellow's up against it,
And he hasn't got a cent,
And his shabby clothes belie him
For a high toned gent;
Then his friends will, ordinary,
Hand him out the stony stare;
For the hard-luck down-and-outer
Isn't wanted, anywhere.

But I've been thinkin' of the difference
In the way they treat a guy
When he's all got up in khaki,
And he's ready for to die.
When the bugles start to blowin'
Then life don't seem quite so raw;
For a hobo is a 'hero,
When he's leavin' for the war.

MEDICAL DIAGNOSIS FOR THE STUDENT AND PRACTITIONER. By Charles Lyman Greene, M.D.; Attending Physician, St. Luke's Hospital, St. Paul. Cloth. Price, $10 net. Pp. 1302, with 562 illustrations. Philadelphia: P. Blakiston's Son & Co., 1917.

This fourth is a thoroughly revised edition, and is an expansive volume. The illustrations, many of which are in colors, cover the whole field of medical diagnosis. The work includes both physical diagnostic methods and laboratory procedures. Considerable space is given to practical advice on case taking, relative values of various observations, and other points culled by the author from his experience of many years as practicing physician, consultant and teacher. By the use of different styles of type, the author is enabled to lay varying degrees of emphasis on certain points, which is a distinct advantage to the student who must select from the vast mass of material those facts that he desires to memorize. An elaborate and efficient index completes what may be characterized a most practical book.

# Medicolegal

## Liability Not Diminished by Anything Physicians Did or Failed to Do

*(Farnon vs. Silver King Coalition Mines Co. (Utah), 167 Pac. R. 675)*

The Supreme Court of Utah holds that there was no error, in this personal injury case, in an instruction to the jury that the damages to be awarded the plaintiff should not be diminished because of anything the physicians did or failed to do. The court says that whether this instruction was valid or invalid depended, of course, on the facts and circumstances of the case and the law applicable to such facts, rather than on propositions of law applicable to a different state of facts. The plaintiff's left leg was fractured between the knee and hip at about the middle of the long bone. His foot was crushed and lacerated on the bottom, and his whole side, clear up into the shoulder, was bruised, contused, and had begun to become discolored, owing to extravasation of blood in the tissues, at the time the physician made his first examination. The plaintiff was taken to a hospital and treated for his injuries. After he had been there for several days, by some means unexplained, the cast, which had been used by the physicians in setting his limb and holding the broken bones in apposition so that the ends would knit together, became displaced and pushed down. The upper part of the leg became out of place. The bones, instead of being in apposition, lapped over. A new cast was put on the leg in that condition. No weight was attached or used on account of the patient's nervous condition and the expressed fear of the attending physician that he would be more likely to lose his leg. On the point that the limb could not be restored to apposition and weights put on under the circumstances, the testimony of the attending physician was corroborated by the assisting physician. The verdict of the jury was conclusive against the defendant's contention that any increased injury to the plaintiff was due to his own wilfulness or negligence. What did the physicians do to increase the injury? As far as the record disclosed, they did nothing that could have had that effect. They found the plaintiff in a certain condition, for which they were not in any sense responsible. They found him with the cast slipped down and the broken bones lapping one over the other. They did their best, under the circumstances, according to their testimony. They put on a new cast in the condition the limb was in without effecting an apposition of the broken bones, and without attaching weights to the limb. This, they concluded, would be impracticable and exceedingly dangerous. So far from doing anything to increase the injury, what they did was a distinct benefit, and left the limb in a better condition than they found it. The next question was, What did the physicians fail to do that increased the injury? This question has already been answered. The testimony tended to show that all was done that could be done without making matters worse. Unless, therefore, the law is such that a party who is responsible for an original injury may, nevertheless, be relieved from responsibility for an aggravation of that injury by accidental means, the court cannot conceive how the defendant in this case could escape liability for whatever injuries the plaintiff sustained. Finding, as the court does from the record before it, that the increased injury to the plaintiff was not due to his own negligence or wilfulness, or to any intervening efficient cause, it follows as a matter of law that it must be attributed to the original injury resulting from the negligence of the defendant.

## Physicians Testifying as to Services of Nurse

*(Higgs vs. Bigelow (S. D.), 164 N. W. R. 89)*

The Supreme Court of South Dakota does not consider that a physician is prohibited from testifying as to the services of a nurse, and their value, by such a statute as the one of that state, which provides that a physician or surgeon cannot, without the consent of his patient, be examined in a civil action as to any information acquired in attending the patient that was necessary to enable him to prescribe or act for the patient. Here the plaintiff, who was seeking to recover from the administrator of an estate for services rendered as a nurse, called as a witness, to prove her services as a nurse, and the value of them, a physician who attended the decedent during his illness, and for the same purpose called the physician who attended the wife of the decedent during her last illness. The defendant objected to this testimony on the ground that a physician is not competent to testify to any communication made to him, or to anything he saw or heard while attending his patient, such being privileged communications. But the court does not think the objection well taken. It deems it sufficient to observe that these physicians testified only to the general character and value of the services rendered by the plaintiff as a nurse, and were not examined and did not testify to any information acquired in attending their patients, necessary to enable them to prescribe or act for such patients.

## Notes Given to Persons Practicing Medicine Without a Certificate

*(Whitehead et al. vs. Cober (Ala.), 76, So. R. 484)*

The Court of Appeals of Alabama, apparently after a reversal, on a rehearing affirms a judgment in favor of the defendant, who was sued on a promissory note given by him to parties called Dean & Dean, in consideration that they should treat his wife by "chiropractics." The defense interposed was that the services for which the note was given were rendered by the payees of the note in violation of the criminal statutes prohibiting the practice of medicine by any one who has not obtained a certificate of qualification from the board of medical examiners. To somewhat that effect was what was called the defendant's second plea. His third was similar, except the reporter states it alleged additionally that W. K. Dean, one of the payees of the note, resided in Etowah County, Ala., and was treating and offering to treat diseases of human beings contrary to law, and in violation of the criminal statutes of Alabama, in that at that time, and prior thereto, Dean had not filed in the office of the judge of probate of Etowah County a certificate of qualification issued by the state board of medical examiners of Alabama. The plaintiffs filed a replication to Plea 2 that the title to the note, which note was complete and regular on its face, was, before maturity, in due course, in good faith, and for value, acquired by them, and that at the time it was negotiated to them they had no knowledge or notice of any infirmity in the instrument, or defect in the title of the person negotiating it, and no knowledge or notice of the alleged acts set up as a defense to this action.

The statutory provisions found in Chapter 39 of the Code, embracing Sections 1626-1646, the court says, are regulations for the benefit of the public as well as for persons dealing with those who hold themselves out to the public as professionally qualified to treat diseases of human beings; and it is the public policy of the state to punish the violation of these statutes, and contracts made in violation of these statutes are void in the hands of all persons involved in the guilt of the transaction. In addition to interdiction of the act or transaction out of which the alleged cause of action arises, the statute (Section 1644) provides: "A physician whose certificate of qualification is not on record in the county in which he resides shall not be entitled to recover at law any compensation for services rendered in treating diseases of human beings." Sections 1644 and 7564 are *in pari materia* (on the same subject or of equal dignity), the latter section prescribing a penalty for practicing medicine without a license; and when the sections are construed together, in effect, any contract made in violation of these statutes is void *ab initio*, or from the beginning; and a note "resting on a void contract" cannot be protected against the defense set up in Plea 3, and the demurrer to the replication as to that plea was properly sustained. If the court erred in sustaining the demurrer to the replication as to Plea 2, it was error without injury, as the undisputed proof sustained the third plea, which was a complete answer to the complaint.

# Society Proceedings

## CHICAGO MEDICAL SOCIETY

*Regular Meeting held Feb. 13, 1918*

The President, DR. CHARLES E. HUMISTON, in the Chair

## MEDICAL SERVICE IN THE ARMY AND NAVY

### Medical Service at Camp Grant

MAJOR WILLIAM L. BAUM, Camp Grant, Ill.: Immunity from contagious and infectious diseases at the camp is due largely to the early recognition and character of the work done by the various medical officers. There are 279 medical officers in the camp, and eighty-two at the base hospital. Courses of instruction and lectures are given at the camp.

Up to the present time there have been 643 cases of measles, with two deaths from bronchopneumonia; German measles, 7 cases; diphtheria, 57; diphtheria carriers, 106; meningitis, 14; carriers of meningitis, 15; scarlet fever, 59; mumps, 295. Among all these cases there have been only four deaths. One hundred and four lobar pneumonia patients have been cared for by the medical department, with nine deaths. Since the inception of the camp there have been 27 deaths from all causes, and among them 2 from delirium tremens; 1 from mediastinal sarcoma; cerebral hemorrhage and cerebral syphilis, 1 each; dementia praecox, 1, and tuberculous peritonitis, 1.

In the surgical department, 550 major operations have been performed, with three deaths.

In the tuberculosis work following the examinations of 21,700 men, 204 tuberculous men were found, and of this number, 138 were dismissed from the Army.

Regarding my own department of genito-urinary and skin diseases, there are only twenty-six patients with venereal disease in the base hospital at present. Out of 27,000 men, only 20 per cent. have what is commonly known as "the social diseases" at the present time, a far smaller percentage than would be the case if the men were under home environment. It is easy to see how this can be so. The men at the camp are constantly under surveillance 85 per cent. of the time, while at home they are under the observation of their friends and relatives only 15 or 20 per cent. of the time.

### Problems of the Medical Officer of the Navy

MEDICAL INSPECTOR H. E. ODELL, U. S. Navy, Great Lakes, Ill.: Entering, as we all do from civil life, our first problem is to adjust ourselves to the changed environment, its peculiarities and necessities, so that the cog which we form in the machine shall move with the least friction and greatest efficiency.

Our duties are divided into periods at sea and ashore, the former being more nearly fixed, as three years is usually considered the time of such duty, while the shore period is more variable, but is usually of about two years' duration.

The medical officer must make himself familiar with the structural characteristics of his ship, the efficiency of its ventilating system, and all of its sanitary features. Once each week, and oftener if deemed necessary, he must make a thorough inspection of the entire ship and report in writing any sanitary defects found, submitting recommendations for their correction. Should contagious disease appear on board, his labors are greatly increased, as examinations of the personnel and ship must be of daily occurrence. He must be prepared to take care of any surgical work that may present itself, and accident surgery is extremely liable to be encountered during rough weather, for reasons that are obvious. He must instruct the various officers in first aid, who in turn impart this instruction to the men under their command, so that hurried dressings can be applied when practicable during naval engagements.

In the Navy, the primary object of the existence of the ship as a fighting vessel must always be borne in mind. During an engagement, the welfare of the wounded individual is primarily in the hands of his mates, and is decidedly secondary to fighting, success in the engagement being the only thing that counts.

When cruising in tropical waters, the medical officer must keep constantly informed of the diseases prevalent in ports visited, and the sanitary conditions of the towns and their vicinity, where members of the crew are likely to wander in their periods of shore leave. Expeditionary forces have more frequently been landed in tropical and oriental countries than elsewhere, and some tropical disease or diseases, such as yellow fever, malaria, dysentery, cholera or plague, are almost certain to exist in the vicinity. The medical officer lands with this force, and on him falls the responsibility of making such recommendations as to prevent the introduction of these diseases into the command.

The professional work in naval hospitals does not differ from that of civil institutions, but in addition the naval medical officer has many other duties. He is responsible for the care, cleanliness and discipline in the hospital, its maintenance and upkeep in every way, food for the personnel, diets for the sick, fuel, ambulance service, beds and bedding, drugs, all medical and surgical equipment and appliances, the keeping of the necessary records, the making of reports and returns, the training of attendants, keeping the families or friends of the sick informed of their condition, and the disposition of the dead.

### Points in the Epidemiology of Meningitis

SURGEON O. J. MINK, U. S. Navy, Great Lakes, Ill.: The recruit is a distinct study in the prevention of infectious diseases, especially meningitis. From the time he enters the naval camp until he becomes a seasoned sailor, he probably undergoes one of the greatest changes that has ever taken place in his life. From a boy who lived in his own room and suited his ventilation, diet and clothing to his own tastes, he becomes a man who lives in constant association with other persons, and in all the matters of life his affairs are regulated to suit the majority of his fellows.

Without an appreciation of the status of the recruit, it is impossible to understand why we have meningitis in the Army and in the Navy.

If we look over the literature of meningitis for the past 100 years, we find the oft repeated statement that meningitis is a disease of young recruits; that meningitis occurs in men shortly after they are mobilized for service, and that it disappears among these men after they become accustomed to military and naval life. These facts are clearly illustrated in the recent epidemic at the Great Lakes. In considering this epidemic, it is necessary to distinguish between two types of diseases, the sporadic case, and the sharp, concentrated outburst of meningitis.

It is necessary to consider the plan of the camp at Great Lakes and to follow the course of the sailor from his entrance into detention until he leaves for one of the stations in the East. On his arrival at the camp, the recruit is placed in what is termed "incoming detention." We find that here he is tenderly cared for, with a distinctive appreciation that he is a civilian who is undergoing a great change in his habit of life. He receives an outfit of clothing, and is then turned over to the physician for vaccination, typhoid prophylaxis, and the various examinations. Those in charge of detention clearly realize that at this time the recruit is of little value to the government. He has made great changes in his life, and it is only reasonable to expect that great changes in his health will result. We find that during the detention period the recruit does not develop meningitis. Although watched for a long period, no cases of meningitis have ever developed in detention. That this is not due solely to the type of barracks is illustrated by the fact that men living in the same type of barracks and doing duty in which they are subject to exposure do suffer from the disease. The seaman guard, which is always quartered in this camp, has suffered severely from meningitis. We do not believe that this is due either to the presence or the absence of carriers, because we find that recruits on their arrival at the station show a large percentage of positive cultures for the meningococcus, in many cases 25 per cent. We do not believe that this freedom from meningitis during the twenty-one day detention period

is due to a long incubation period from the disease, because we have held men in this camp for thirty days without developing meningitis, and to suppose that acute infection has an incubation period of over thirty days is practically to suppose that it has no incubation period at all. We found, therefore, that with tender care the recruit passes through the first three weeks of his service without meningitis. At the end of three weeks in detention, the supposed veteran sailor passes to what is termed Camp Dewey. Many of his previous restrictions are removed and many new duties are thrown on him. He is granted liberty; he is allowed to go to public gatherings, such as the Y. M. C. A.; he is made to drill, and he is made to take part in all the work connected with his regiment.

During the first part of January, this work was very severe, as it was a continual fight during the severe snowstorm to keep the roads and walks about the camps in a passable condition. If the burden thrown on the recruit at this time is out of proportion to the amount of seasoning which he received in "incoming detention," we find that he begins to suffer from minor ailments.

In the case of the Second Regiment, we found within a few days that there occurred a regimental outbreak of coughs and colds. Practically the entire regiment was crippled by bronchitis, coryza and influenza. Within four days from this time the first case of meningitis in this regiment appeared. A case a day appeared for about four days, then two cases a day, then three, and so on until at the height of the trouble, seven cases appeared in this regiment in twenty-four hours. In all, the regiment had from twenty-five to thirty cases during a period of about three weeks. With the subsidence of the epidemic of bronchitis and influenza, the meningitis began to subside. Many steps were taken to remedy the conditions in this regiment, but it is impossible to state honestly that any measures had the slightest effect on the disease, except the general care of a regiment that was below par physically, and the gradual hardening of this regiment to the conditions that they encountered.

In this regiment a careful study of carriers leads to the conclusion that measures to control the disease through the carrier method are absolutely worthless. A study of carriers in this connection yields many interesting observations concerning carriers, but throws little light on any method in this connection that can be utilized in controlling an epidemic of this nature.

It was possible during the epidemic to make cultures of practically every one of the twenty-four barracks connected with regiments. We found barracks in which meningitis developed that contained 8 or 9 per cent. of carriers. On the other hand, we found barracks in which no meningitis developed that contained 25 or 30 per cent. of carriers. In the instances in which a large percentage of carriers was found, carriers were removed; and in other instances the carriers were left in the barracks. New cases failed to develop in both instances. It was early found impracticable to remove all the carriers without producing overcrowding among the carriers, which resulted in additional cases. There seems little doubt that the oft repeated statement that carriers rarely develop the disease is erroneous, as the incident rate among carriers is higher than the rate for the general station. It is not the intention to maintain that carriers do not transmit the disease, but it is maintained that to combat this disease by the removal and segregation of all carriers is absolutely impracticable.

Other factors in controlling the disease are of so much greater importance and have been so neglected, owing to the enthusiasm of studying carriers, that it seems necessary to point out a few fallacies in the theory. Were it not for the fact that meningitis has always been held to be a serious disease, it would probably not inspire so great consideration as it does at present. Even in the most severe epidemics among recruits, a relatively small number of men develop the disease. In an army of 25,000, to fight a disease that affects only a small proportion and kills or disables a still smaller proportion, by segregating all carriers, is uneconomic and entirely against military efficiency. So large a proportion of persons in perfect health carry the meningococcus in their throats that the segregation of all carriers would practically mean the disbanding of the present training stations. If we segregate three out of every ten men as meningococcus carriers, we could with equal reason segregate three more of every ten as pneumococcus carriers, as we find that the distribution, spread and etiologic factors are practically the same in the two diseases.

As we progress in the war and in the experience of training the recruit, meningitis will disappear, and we shall probably attribute this to the intensive study of the carrier; and years from now, in the advent of another war, the recruit will again furnish the ever present problem of meningitis.

### Pneumonia

Major Joseph L. Miller, Camp Dodge, Iowa: Up to last evening (February 12) 210 pneumonia patients were received in the base hospital at Camp Dodge. Of this number, in about 80.5 per cent. of the cases the disease appeared in the colored troops. Although they represented only one sixth of the strength of the camp, they represented 50 per cent. of the cases of pneumonia. When it comes to the mortality rate, the colored troops represent three fourths of the total mortality from pneumonia.

Orderlies, nurses and medical attendants are required to wear masks, caps and gowns in looking after pneumonia patients. Visitors are not allowed except in cases of extreme illness.

The sputum of pneumonia patients is collected on paper napkins, placed in a paper bag and burned.

At the camp, pneumonia patients are seen early, as compared with an institution like the Cook County Hospital, where they are seen late. Patients are seen within a few hours after the initial chill and pain. Pneumonia is suspected, on account of pain in the side, twenty-four or forty-eight hours before a physical examination will reveal the location of the pneumonia. These patients are roentgenographed at once, and it is found that the roentgen ray will show beginning pneumonia many hours before one is able to detect it by the physical signs. Many of the patients present a typical history of the onset of the disease, with chill and pain in the side, and within two or three days the temperature is normal, although the temperature runs high at first. If one depends on the physical findings in quite a large percentage of cases, he will find that acute bronchitis cases are in reality cases of pneumonia, as shown by the roentgen ray, which do not reach complete consolidation of the lung, and which run a very brief course, although a very intense course, as far as the temperature and evidences of intoxication go.

Another point of interest is the great frequency of empyema. This is not present alone in cases at Camp Dodge, but it has been present throughout all camps. At Camp Taylor, according to Major Hamburger, of 175 cases of pneumonia, there were forty-eight cases of empyema. The Surgeon-General has called attention to the frequency of empyema and has recommended exploratory puncture in order to detect its presence. Not only are empyemas very frequent, but they are difficult to detect.

We have made it a rule to get a leukocyte count every third day throughout the pneumonia and to have the patient, if he is not too ill, roentgenographed every third day with the hope of detecting the presence of empyema. There is usually a thin layer of pus, perhaps one-quarter or one-half inch thick, covering the involved lung, so that as far as the physical findings go they are not those of a collection of pus. There is distinct bronchial breathing, and there are distinct râles close to the ear, and one scarcely suspects that the patient could have a collection of fluid. In these cases if one introduces the needle through the chest wall and the small, narrow, intervening layer of pleural space directly into the solid lung and aspirates, he will fail to get anything. It is only with the greatest care, introducing the needle through the chest wall and drawing on the plunger of the syringe to see if there is pus present, that one is able to detect it. In two cases in which they felt sure they had pus, still they were unable to detect it with the roentgen ray or with the needle before death; yet at the necropsy these patients showed small empyema in the interlobular space containing not more than

2 or 3 ounces of pus, but sufficient to be an important factor in determining a fatal termination of the condition.

In a number of cases of empyema, necropsy has shown a purulent pericarditis. In the cases of empyema in which operation has been performed, there have been six deaths. Those patients that have died following operation and have come to necropsy have shown that there was only one pocket drained, or the patients had double empyema.

The roentgen ray as an aid in detecting the presence of localized collections of pus has not helped much.

Another point is the large number of cases of pneumonia simulating appendicitis. They have had six or eight of these, and at first the surgeons operated on these patient without consulting the medical staff; the first two or three patients continued to have a high temperature after operation, and were found to have pneumonia. Since then in practically all suspected cases of appendicitis a man from the medical service has been called in, and it has been difficult in many of them to determine whether one was dealing with an acute appendicitis or with pneumonia.

At present, there has not been a single death from pneumonia of Type I. Most of the cases have been of Type II or Type IV. The mortality in 200 cases of pneumonia up to date has been 10 per cent. In the first seventy-five cases the mortality was only 3 per cent. In the first 100 cases the mortality was 7 per cent., and in the last 100 the mortality has been a little higher. In the lobar pneumonias the mortality has been 10 per cent.

The method of treatment has been exceedingly simple. It consists in keeping the patient in bed, paying particular attention to the diet, and giving him what was thought to be needed. He is given morphin enough to control pain and to insure sleep. He is made as comfortable as possible by the administration of a hypodermic of morphin. The only other medication is digitalis, 3 minims, three times a day, and this being increased as the pulse increases in rapidity to 15 minims every three hours. The ward is well ventilated, but in case a patient becomes dyspneic, he is moved into the solarium or to a window that is slightly open to give him all the fresh air possible and to take away the expired air.

The colored troops are much more susceptible than the white troops and show less resistance to pneumonia.

### Work Accomplished by the Advisory Commission of the Council of National Defense

MAJOR FRANKLIN H. MARTIN, Washington, D. C.: The Medical Section of the advisory commission of the Council of National Defense was organized to aid in the enormous task of expansion of the bureaus of the two Surgeon-Generals. A plan was adopted for a general medical board on which were placed representatives of the civilian medical profession, the Surgeon-Generals of the Army, the Navy and the Public Health Service, and representatives of the Red Cross; officers of the principal societies—surgical and medical—of the country. This consisted of the presidents, board of directors, or boards of regents, of the American Medical Association, the American College of Surgeons, the Clinical Congress, the American Surgical Association, and other like bodies. This board holds a session once a month, and through a well developed system of committees, almost everything of importance in the conduct of war, from the standpoint of medicine and sanitation, is discussed, and recommendations are presented. These recommendations are in turn presented to an executive committee on the following day, this committee consisting of the Surgeon-Generals of the Army, the Navy and the Public Health Service, the chairman and vice chairman of the General Medical Board, Dr. Victor C. Vaughan, Dr. William J. Mayo, Dr. William H. Welch, and Rear Admiral Cary T. Grayson. The chairmen of the various committees make recommendations. If these recommendations are approved by the executive committee, they are taken to the council, and if approved by that body, are distributed in the way of information to those in authority in the bureaus concerned.

In each state and county there have been organized state and county committees which place us in touch with all county medical societies. Through this rather complicated, but very effective, organization, we have been able to place much to the credit of the Advisory Commission. Our accomplishments may be summarized as follows:

1. We have succeeded in enrolling 21,000 civilian physicians for the Medical Reserve Corps.

2. We have aided, through the Munitions Board and other agencies connected with the Advisory Commission, in obtaining supplies for the medical departments of the Army, the Navy, the Public Health Service, and the American Red Cross.

3. Through conferences with experts, called at different times, which conferences appointed committees and cooperated with the Surgeon-Generals, we have prepared and published standard tables of instruments, drugs, hospital supplies, and hospital equipment. These tables carefully record by number all materials made in this country that are available for our work.

4. One of the conferences of deans of medical schools succeeded in adjusting the difficulties in enrolling a large number of civilian physicians as reserve officers from among the teaching forces of the medical schools.

5. Another conference discussed in detail the proper handling of venereal diseases and the relation of the alcohol problem to venereal diseases. This conference resulted indirectly in the appointment of the Fosdick Committee and of our strong committee in the Council of National Defense, dealing with the venereal disease problem, and emphasized in the Surgeon-General's Office the importance of this problem.

Two matters of unusual importance have been taken up recently by the General Medical Board of the Council of National Defense. One is the organization of a volunteer medical service corps. Briefly, this consists of men who have offered their services to the Surgeon-General and who, for physical or other reasons, have been exempted, and for medical men over the enrolment age who are willing to do some kind of service for their government, preferably along military lines. The original recommendation of the committee formulating the plans for this service stated that this organization could be of service to the government in the following ways:

1. By aiding in the work of selective enlistment. This is now being done by the Medical Advisory Boards, many of whose members should be eligible to the Volunteer Medical Service Corps.

2. By acting in general as consultants wherever consultation may be necessary for enlisted men.

3. By maintaining in the best possible condition the medical services of hospitals, medical colleges and laboratories, depleted by absence of those in active duty.

4. By reclamation of registrants rejected for physical unfitness under the Selective Service Law.

5. By caring, so far as possible, for the families and dependents of enlisted men.

6. By aiding in the general sanitation of the country.

The formal recommendations for the organization of the Volunteer Medical Service Corps, accepted and approved by the Council, are retained in the following resolutions:

*Resolved*, That the Council of National Defense authorize the Medical Section of the Council of National Defense to organize a Volunteer Medical Service Corps to include in its membership those physicians ineligible for membership in the Medical Officers Reserve Corps on account of physical disability, over age, essential public or institutional needs and women physicians, for the purpose of making available the services of such physicians in any way deemed advisable by the Surgeon-General of the Army, Surgeon-General of the Navy, Surgeon-General of the Public Health Service, or the Council of National Defense: and be it further

*Resolved*, That an appropriate insignia be authorized to be worn by the members of the Volunteer Medical Service Corps, the form of such insignia to be designed by the Medical Section of the Council of National Defense.

The important organization, in all its details, will be under the direction and authority of the General Medical Board of the Council of National Defense.

The second innovation to which I refer is the establishment or authorization of the council of a committee on industrial hygiene and surgery.

The resolution asking for the creation of such a committee states definitely the activities to be represented. It reads as follows:

*Resolved*, That there be created an Advisory Committee on Industrial Hygiene which shall be made up of a representative from the Public Health Service, acting as chairman, a representative from the following federal agencies: Department of Agriculture, Department of Interior, Department of Commerce, Department of Labor, and a representative from each of the following: organized industry, organized labor, organized medicine, and organized industrial medicine.

This brings me to the consideration of my last problem. It is not generally realized or appreciated that thirty-nine out of every forty medical officers among the fighting forces of our Army will be civilian physicians. This places enormous responsibilities on the civilian physicians. In order to carry out adequately these responsibilities, it will be necessary for the reserve officer to have rank that will place him somewhere near the same footing as the regular medical officer. Two bills to secure the rank and authority exactly alike were presented in Congress, February 5—Senate bill 3748, introduced into the Senate by Senator Owen, and House Resolution 9563, introduced into the House by Mr. Dyer. These bills are similar to the one introduced by Senator Owen last year as an amendment to another military measure.

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## ANNUAL CONGRESS ON MEDICAL EDUCATION, PUBLIC HEALTH AND MEDICAL LICENSURE

## FOURTEENTH ANNUAL CONFERENCE OF THE COUNCIL ON MEDICAL EDUCATION OF THE AMERICAN MEDICAL ASSOCIATION

*Held in Chicago, Feb. 4, 1918*

(*Continued from page 485*)

### The Student's Clinical Course in Medicine

Dr. George Dock, St. Louis: The medical student on admission has had a standard four year high school course and at least two years of college work. Besides three hours a week for one year in English, and reading German or French, the greater part of the time is given to the study of physics, chemistry and biology. No medical work is attempted. Knowledge of principles, technical skill in experimental and routine manipulations, and a scientific point of view are the aims.

The work in medicine begins in the second third of the sophomore medical year. Before this time anatomy, biologic chemistry, physiology, pharmacology, pathology and bacteriology are studied, without any effort at considering their relations to internal medicine excepting in pathology and bacteriology. Of course, medicinal preparations are used in part in pharmacology. The student is still engaged in the study of general pathology and physiology. He begins also to study surgical pathology and technic. He begins medicine with several elementary courses. One is a reading and recitation course, including a discussion of the causes and nature of disease, terminology and classification, methods of making diagnoses, prognosis, and the development and present state of therapeutics. Advice is given regarding methods of study, use of the library, and notes. Physical diagnosis is begun at the same time, use being made of normal subjects—fellow students—anatomic preparations, especially those showing relations, models, roentgenograms, and lantern slides from textbooks. Special articles are explained, with a constant drill and technic in which the students mark out areas with waxed pencils and make notes on diagramed cards (forty-four hours). There is also a short course (eleven hours) in case taking, illustrated by actual histories to show the plans, and to exhibit avoidable common faults.

Once a week the sophomores attend the propadeutic clinic (in which patients with visible signs are examined by third year men) for practice in observation, description and interpretation on lines chiefly physiologic. Sometimes a brief historical excursion is made, as the reading of Parry and Graves on exophthalmic goiter; Stokes and Adams, and Erlanger on heart block; Hodgkin, Wilks, Sternberg, Dorothy Reed and Bunting and Yates on Hodgkin's disease; Corrigan on aortic disease, etc. (eleven hours).

At the end of this eleven weeks and after examinations on work are completed, more practical clinical work is taken up. The recitation continues. Physical diagnosis is followed up on patients in the wards. The class examines patients with abnormal signs, again making diagrams and notes. The roentgen-ray department is utilized for fluoroscopic examinations and roentgenograms. In this third trimester the student begins clinical work in the outpatient department.

Each clinical department in the dispensary has a laboratory, equipped for its needs. There is a separate room in which gastro-intestinal patients have stomach or duodenal tubes passed, and here microscopic and chemical examinations are made, including blood for Wassermann tests. Neurology, tuberculosis and dermatology have quarters on the floor below medicine. The surgical and pediatric quarters are on the same floor as medicine, and all have the same hours, so that consultations can be made without delay.

A course in neuropathology is given in the first trimester of the junior year, in which, following a summary of neural anatomy, the gross and microscopic lesions of the nervous system are studied, with practical exercises in the examination and description of morbid tissue (twenty-two hours). This is carried on with and followed by lectures and demonstrations on the clinical anatomy and physiology of the nervous system (twenty-two hours). Similar exercises are being carried on in surgery, obstetrics and gynecology. Practical ophthalmology, including the use of the ophthalmoscope, is studied in the middle trimester of the third year. Laryngology and rhinology are studied in the same trimester, both lines being carried out in the special clinics, with extensive material and large and efficient staffs.

The fourth year, which begins in the last trimester of the junior year, is mainly devoted to ward work in sections. Medicine, surgery and obstetrics, gynecology, pediatrics, genito-urinary surgery, ophthalmology, otology and laryngology have each one third of a year, eleven working weeks. There are five one hour clinical exercises a week, two in medicine, and one each in surgery, pediatrics, obstetrics and gynecology. The rest of the time is given over to practical work in the wards, outpatient departments, laboratories and library.

In the wards, the section members serve as a part of the house staff. The undergraduates take histories and make their own physical examinations. The first complete physical examination is made by the intern, the undergraduate acting as amanuensis. The blood and urine examinations are made by the undergradute, but are examined and described by the intern. All positive findings, as albumin, casts, elastic tissue, important blood smears, etc., are examined and checked soon after by an older man. Stomach examinations, stool examinations, blood cultures and serologic examinations are arranged for as early as possible. There has been no inconvenience or complaint either from patients, nurses or hospital authorities on account of the work of undergraduates.

### Medical Education, Medical Interns and the War

This paper, by Dr. Horace D. Arnold, Washington, D. C., appeared in The Journal, Feb. 16, 1918, p. 451.

#### Discussion of Dr. Arnold's Paper

Admiral Edward R. Stitt, Washington, D. C.: We have an important problem in the Navy that is different from that in the Army. We were forced to take large numbers of men on graduation who had not received the hospital year. On account of the number detailed to ships, it was absolutely necessary to have several hundred young men who were more or less flexible and could adapt themselves to life on shipboard. We were obliged, therefore, to take men who had not received the hospital year.

The question will come up about making good to these men the loss of this hospital year opportunity. In England, in connection with the Royal Army Medical Corps, they have postgraduate courses in general medicine and general sur-

gery, so that men who have been serving in India or elsewhere for four or five years can, on their return to London, take six months of intensive work in general medicine and general surgery. Four days in each week are devoted to general medicine and general surgery, one day a week on any specialty the man desires, and the remaining day is devoted to laboratory work. If, in our great universities, graduate work can be arranged along these lines, it would give practical work in hospitals representing an intensive internship. We should make up what the young men have lost in the way of the hospital year.

DR. J. M. BALDY, Philadelphia: The scheme outlined brings out the present senior class with no saving of time; it brings the present junior class into service four months earlier, the sophomore class eight months earlier, and the freshman class a year earlier. Any scheme of this kind should be seriously considered by educators lest it might disorganize medical education for what may not be necessary. At the present time, it would be ill advised to attempt to carry this scheme into effect. We should wait until we see what this year's campaign is going to bring forth.

DR. E. P. LYON, Minneapolis: I do not believe that medical education would be disorganized by adopting the scheme outlined. The only difficulty in my opinion is that it would deprive those connected with the fundamental departments of their four months' vacation. The doctor in practice works eleven months and often more. Why should a doctor in the making work only eight months? The teacher gets off with about eight months' work, whereas the lawyer and members of other professions work eleven months or more, and the only reason that is really satisfactory is that the teacher's compensation is poor. I believe the scheme outlined is feasible and can be carried out without disorganizing the medical profession.

DR. JOHN M. DODSON, Chicago: The University of Chicago has had this scheme in operation for a great many years; therefore it is not an experiment. It ought to be a universal scheme, and I predict it will be within a few years. If a student desires to spend four quarters of the year in school and complete the present four year course in three calendar years, he should be allowed to do it.

PRESIDENT WILLIAM O. THOMPSON, Columbus, Ohio: A number of state universities are considering the four quarter plan. The University of Washington has adopted it. It is a bigger problem than we at first realized, however, because I think it is harder to get faculties to think in terms of quarters than it is to reorganize an army.

DR. HANAU W. LOEB, St. Louis: I approve of the plan outlined during the past summer, and up to the present time we have put a similar scheme into effect at St. Louis University.

DR. LOUIS B. WILSON, Rochester, Minn.: The graduate students on the Mayo Foundation are required to put in forty-eight weeks in the year. Most of them put in fifty weeks from choice. Most of them are graduates of medical schools and have had a year in a general hospital. They show no evidence of extreme weariness, and the young men are hustlers. To my mind it is the utmost stupidity to continue a thirty-two or thirty-four week course in medicine, as we have been doing for years. It is a dead loss to the state.

DR. GEORGE DOCK, St. Louis: Efficiency boards have been testing out a lot of people, and they find they can get more out of them by intensive work in eight hours than they can in twelve. We may find that medical students can do more work in nine months in the year, properly trained, than in twelve if they are imperfectly trained. However, one can easily see the advantages of the four-quarter system apart from the splitting up scheme.

DR. H. E. BEEBE, Sidney, Ohio: I heartily approve of the four quarter system. There is one possible source of difficulty that has not been referred to, and that is the relationship of colleges and preparatory schools to this plan.

DR. W. F. R. PHILLIPS, Charleston, S. C.: I do not know how it may affect Northern colleges, but for our Southern colleges the continuous session would not work satisfactorily. Most of our students have to depend on the crops they raise during the summer to pay their tuition fees and other expenses.

DR. JAMES EWING, New York: Although I did not hear the paper, I think the wisdom of such a scheme will depend on the schools that can adopt it. Conditions vary considerably in different schools. At Cornell a year ago we appointed a committee that spent considerable time in getting all the information possible for and against the plan. We received information from Canada that they had tried the plan and that it was not working out satisfactorily, for the reason that the product they were turning out was not up to standard.

DR. FRANK W. LYNCH, San Francisco: I wish to offer the following resolution:

*Resolved*, That it is the sense of this conference that a plan of intensive training, shortening the course of medicine one year, without sacrificing present standards, be approved as a war measure; and that state boards and universities be requested to take such action as will conform to it.

The resolution was seconded and carried by a vote of 37 to 16.

## JOINT SESSION OF THE COUNCIL WITH THE FEDERATION OF STATE MEDICAL BOARDS

### Cooperation for Prevention of Medical Frauds

DR. DAVID A. STRICKLER, President of the Federation of State Medical Boards of the United States, Denver: All concerned in public health and welfare are interested in the prevention of fraud, but not all have equal opportunity to prevent it. Those who control educational institutions have to do with the moral character of the student on admission and throughout his student life. It is likewise the function of the educator to establish and maintain proper educational standards. Those who establish high standards need to be supported by the medical profession and by licensing boards in particular so that institutions of lower standards may not be permitted to flourish. Cooperation with the better colleges is essential to prevent diplomas being granted without merit. Large numbers of fake institutions are incorporated and run without supervision by state, board of education, or profession in nearly every state; institutions wherein fads of every description are promulgated, taught and disseminated by individuals who have no educational standards for themselves or their students, but who issue diplomas which are quite as imposing as those of merit and are much more likely to be exhibited to the public.

The people should be educated on the aims and accomplishments of the medical profession and to the need of legitimate educational standards for all who would practice the healing art. Minimal educational standards should be required of all institutions incorporated to teach any profession.

The prevention of fraud in the practice of medicine and the surveillance of immoral acts of physicians rests definitely with licensing boards. We meet failure, however, because the profession does not inform the board regarding offenses, and because of the lack of intercommunication between boards on matters of mutual interest.

State medical boards may be mutually helpful by reporting their action with relation to all applicants, with reasons for refusal to license, to a central body by which all information could be tabulated for the benefit of other boards. There should be a surveillance of noted characters who operate in several states under their own or assumed names, alone, or with other licensed or unlicensed persons, with a view to prosecuting them for offenses against medical decency.

All state medical boards should systematically and in a routine manner report full data in regard to medical crooks, imposters, abortionists, and the like, together with an account of all official actions affecting the rights of physicians, to the Biographic Department of the American Medical Association; and every list of applicants together with claimed qualifications should be submitted to the Biographic Department for checking up before action is taken by the board. This is cooperation in its best sense with an organization working to the same end. Colorado has followed this plan with most excellent results in many instances.

DISCUSSION

DR. J. M. BALDY, Philadelphia: The difficulty of administering the laws of the state is largely one of politics. There is constant political pressure brought to bear on us, but we should always act on the merits of a case irrespective of the result. Most state board members, however, are placed there by politicians. Oftentimes, for political reasons, members of boards are removed as rapidly as their terms expire. They have no chance or opportunity to realize the obligations of their positions, and as a result politics enters very largely into the administration of state boards of health and examiners. There are very few states in which a more successful step has been taken against the interference of politicians than in Pennsylvania; but sometimes the irregular medical crooks come in such a way that, in spite of all we can do, they will slip through our hands.

DR. WALTER L. BIERRING, Des Moines, Iowa: We ought to have an information bureau, and we should take advantage of the bureau conducted by the American Medical Association. From my association with the bulletins issued to state boards, I know it has complete data on irregular practitioners and the other matters referred to by the president.

DR. WALTER P. BOWERS, Boston: Two years ago a man appeared in the examination of the Massachusetts board, and it was discovered he was impersonating a Russian Jew. He hailed from New York. That investigation led to the discovery that a man who lived in Philadelphia was carrying on a bogus diploma mill. He agreed for a sum of money to secure registration for an individual in Massachusetts. The state police of Massachusetts went to Pennsylvania, secured extradition papers and brought that man back to Massachusetts. He was tried and convicted, and sent to jail. The state board in Massachusetts is not bothered with politicians.

DR. HUBERT A. ROYSTER, Raleigh, N. C.: One of the worst cases the board of North Carolina has had to deal with came from Pennsylvania. A man with a diploma from a Class A school appeared before our board for reciprocity. He was examined twice and failed. He then went to New Jersey, was licensed by that state board, and he is now in the Reserve Corps of the Army. Politicians do not control the board in North Carolina. Our board is not appointed by the governor, but is elected by the state medical society.

MR. AUGUSTUS A. DOWNING, Albany, N. Y.: State boards cannot be too careful about the identification of the men who take their licensing examinations. Through the cooperation of Dr. Bowers and the Massachusetts state detective, we have just returned to Massachusetts a bona fide license to practice medicine in that state, which was given to a pharmacist who was never inside a medical school. We also have got the man who impersonated this pharmacist in the Massachusetts examination.

DR. N. P. COLWELL, Chicago: At the Association headquarters we have a complete official list of the graduates of all medical schools, and have the means of knowing whether a man graduated from a medical school or not. Recently a man licensed in a Southern state claimed graduation from an extinct medical college. We found that his name did not appear either among the graduates or among the students of that college. We have written to the graduates of the college of the year in which he claims to have graduated, asking whether they know anything about him. The replies thus far received do not indicate that he ever graduated from the school. We have been getting reports, such as Dr. Strickler has referred to, from only a few states. It would be better if we could get that information from all of them.

DR. HERBERT HARLAN, Baltimore: We should have a bureau of registration and information. I would urge all gentlemen present to read the last issue of the *Monthly Bulletin* of the Federation, which gives the photographs of diplomas and details in regard to certain cases. Such information as that is valuable.

DR. DAVID A. STRICKLER, Denver: In Colorado the board is not forced to license any individual. The applicant must satisfy the board as to his moral character. The courts hold that it is our duty to ascertain that fact, and they will not go back of our returns.

*(To be continued)*

# *Current Medical Literature*

## AMERICAN

Titles marked with an asterisk (*) are abstracted below.

### American Journal of Diseases of Children, Chicago

February, 1918, **15**, No. 2

1 *Etiology of Phlyctenular Conjunctivitis. W. S. Gibson, Chicago.—p. 81.
2 Surgical Diseases of Urinary Tract in Children. A. Hyman, New York.—p. 116.
3 Sexual Precocity in Male; Report of Case. A. Strauch, Chicago.—p. 132.

1. **Phlyctenular Conjunctivitis.**—Clinical observations in ninety-two cases of phlyctenular conjunctivitis revealed the presence of tuberculosis in ninety cases, as shown by a positive von Pirquet test. In the two giving a negative reaction, the diagnosis was doubtful. No other condition, either local or general, could be found with sufficient frequency even to suggest any direct influence in producing the disease. Phlyctenules were produced experimentally in tuberculous rabbits in eight instances; six times as a complication of a conjunctival reaction resulting from the instillation of tuberculin, twice in the absence of local irritation of any kind. Numerous attempts to produce the condition in animals not tuberculous were unsuccessful. The pathology of the experimental lesions was similar to that of human phlyctenules. The microscopic findings suggested a tuberculous origin. Gibson is convinced that all clinical, experimental and pathologic evidence points to tuberculosis, and tuberculosis alone, as the cause of phlyctenular disease.

### Annals of Surgery, Philadelphia

January, 1918, **67**, No. 1

4 *Results of Blood Transfusion in War Surgery. L. B. Robertson and C. G. Watson.—p. 1.
5 *Use of Dichloramin-T in Treatment of Infections and Infected Wounds. W. E. Lee and W. P. Furness.—p. 14.
6 Birth Injuries of Shoulder; Report of Cases. A. P. C. Ashhurst, Philadelphia.—p. 25.
7 *Pulse Rate and Blood Pressure Observations as Aid in Treatment of Head Traumas. P. R. Sieber, Pittsburgh.—p. 51.
8 Fractures of Spine with Cord and Root Symptoms. C. A. Elsberg, New York.—p. 63.
9 *So-Called Mixed Tumors of Salivary Glands. J. Forman and J. H. Warren, Columbus.—p. 67.
10 Case of Hygroma Colli. L. Kahn and S. Graves, Louisville, Ky.—p. 71.
11 Pulmonary Teratoma; Report of Case. H. R. Black, Spartanburg, S. C., and S. O. Black, Rochester, Minn.—p. 73.
12 Gastroduodenostomy: Its Indications and Technic. D. C. Balfour, Rochester, Minn.—p. 80.
13 *Technic of Operation for Repair of Ileocecal Valve. Results in Twenty-Six Cases. J. H. Kellogg, Battle Creek, Mich.—p. 83.
14 Case of Dumb-Bell Stone in Diverticulum of Urinary Bladder. P. Martin, Buffalo.—p. 94.
15 Recognition of Certain Lesions of Male Bladder. E. M. Watson, Buffalo.—p. 96.
16 Treatment of Gonorrheal Epididymitis, Complicated by Peri-Epididymitis. C. S. Vivian, Humboldt, Ariz.—p. 103.

4. **Results of Blood Transfusion in War Surgery.**—Robertson and Watson report on transfusion in twenty-six cases of severe primary hemorrhage accompanied by shock. In four cases of this series the citrate method was used; in one case transfusion was done with the Unger two-way stop-cock. The remainder were transfused by the Lindeman syringe-cannula method. The results obtained have shown: first, that certain patients heretofore considered as inoperable, and others as exceedingly bad surgical risks, often may be revived to a degree which not only permits of radical operative measures, but ensures a good prospect of ultimate recovery; second, in other cases in which the postoperative condition is one of progressively increasing shock, due to the initial loss of blood and to the severity of the operative measures required, blood transfusion is a permanent resuscitative measure of extreme value. In the cases of severe primary hemorrhage 700 to 1,000 c.c. were regarded as constituting an average amount and usually tided the patient over his crisis. Smaller amounts have been given with some success, but the most immediate and lasting improvement has been obtained with the large amounts. Cardiac dilatation in these

exsanguinated recipients has not been observed even with the larger amounts given.

In transfusing 1,000 or 1,200 c.c. the intervals between the injections of the blood filled syringes should be longer toward the latter part than at the beginning of the procedure, and the minimum amount of saline should be introduced into the recipient's vein between the injections of the blood filled syringes. A wounded man who has lost much blood and has a blood pressure below 90 mm. Hg is not a good subject for operation; with a blood pressure below 70 mm. Hg he is in a precarious condition. Loss of blood intensifies to a very great degree the amount of shock produced by traumatism, and in the majority of such cases the immediate issue depends on control or elimination of the effects of hemorrhage. In this series many patients admitted in an inoperable condition from severe hemorrhage have been rendered operable by blood transfusion.

The largest factor in the causation of the shocked condition as seen in patients admitted to a casualty clearing station appears to be the loss of blood, except in case of visceral injury. In two cases hemolysis hastened the death of the patient—in one of these the citrate method was used. The results in this series of cases of severe primary hemorrhage may be classified as: life saving, 22; immediately beneficial but died from infection or operation, 9; no benefit, 3; harmful, 2; total, 36. Although the mortality in this series of cases is comparatively high, the patients were in a desperate condition, and with perhaps one exception could not have been expected to survive if the procedure had been withheld.

5. **Dichloramin-T in Treatment of Infections and Infected Wounds.**—The authors have records of 6,028 civil cases in which dichloramin-T has been used, and of four months' work and 1,200 cases reported by Captain Joshua Sweet with war wounds in the U. S. Base Hospital No. 10 in France. With dichloramin-T they have been able to obtain as good results as they have ever had when using the Dakin hypochlorite solutions with the complicated technic of Carrel. In addition, they found that skin irritation will not occur if the wounds are not covered with thick occlusive dressings. This means the use of the smallest possible amount of gauze dressing and bandage. The small amount of exudate from wounds treated with dichloramin makes it practical to use these thin dressings, and in one institution there has been a saving of 75 per cent. of the gauze and bandages formerly used. Further, a still greater saving in dressing material and time results from the decrease in the number of dressings required for each wound during the period of healing. Rarely is it necessary to dress a wound, even during the first few days, more frequently than once in every twenty-four hours, and after that, intervals of forty-eight and seventy-two hours are usual.

Dichloramin, unlike the aqueous hypochlorite solution, has no effect on the knots of catgut ligatures, and no disintegrating effect on the catgut itself. The occurrence of secondary hemorrhages in wounds treated by the Carrel method was not uncommon in the authors' experience at the American Ambulance. Captain Sweet reports that, in his 1,200 cases of major infected military wounds, there was not one secondary hemorrhage. Too great stress cannot be laid on the value of dichloramin-T as a deodorant dressing. The authors emphasize again the fact that one should not depend on a chemical agent to perform, in the treatment of suppurating wounds, that which can and should be done quickly and thoroughly by mechanical means. Neither chemistry nor bacteriology can, or should be expected to replace the mechanics of surgery. At the best, these chemical germicides can react only on the bacteria with which they come in contact, which means a very superficial process. Therefore, at the primary operation all foci of infection and all devitalized tissue must be removed when possible, by surgical procedures.

7. **Pulse Rate and Blood Pressure in Head Traumas.**—Twenty-six, or 34.2 per cent. of Sieber's 76 cases presented signs of an increased intracranial pressure, accompanied by an elevation in the blood pressure and slowing of the pulse rate. In nineteen, or 73 per cent. of these, the pressure reached such a degree as to endanger the life of the patient and operation was necessary. Ten of the nineteen patients operated on made good recoveries. Of the nine deaths, two were the result of pneumonia and two of meningitis. In each of these cases pressure was relieved by operation and there was every promise of recovery until infection occurred.

In the remaining five cases decompression did not avert a fatal outcome, although at operation all showed evidence of a high grade of intracranial pressure. Twenty-three, or 30.2 per cent., of the 76 cases, when first seen, presented evidence of an advanced medullary compression or severe brain injury. In many of these cases the regulatory vasomotor mechanism had collapsed and was no longer able to maintain the arterial pressure above the high intracranial tension. In other cases the rapidly decreasing blood pressure and increasing pulse rate showed that the vasomotor mechanism was still making a feeble effort to supply sufficient blood to the bulbar centers. Of the twenty-three patients in this group, 20 resulted in death, a total mortality of 87 per cent. In 12 cases an attempt was made to relieve pressure by operation, although they presented signs of advanced compression, evidenced by irregular, shallow respiration and a rapid, low tension pulse. Only three patients recovered, giving an operative mortality in this group of 75 per cent. All the patients in this group that were not operated on died.

9. **Mixed Tumors of the Salivary Glands.**—From a study of seven specimens of the so-called mixed tumors of the salivary glands, the authors believe that there is in the head and branchial region of the human embyro mesenchyme which has been derived from ectoderm, and that inclusion or misplacement of this ectodermal mesenchyme gives rise to the so-called mixed tumors of the salivary glands.

13. **Repair of Ileocecal Valve.**—The number of cases which have been definitely cured of ileac stasis by repair of the ileocecal valve and removal of mechanical hindrances in the distal colon is now so considerable that Kellogg feels justified in making the claim that the lesions mentioned are the true cause of ileac stasis rather than Lane's kink, and in maintaining that when surgical interference becomes necessary the procedure indicated is the simple one of repair of the valve rather than the serious and mutilating operation of short circuiting or of colectomy, except in cases in which the existence of obstructive lesions can be proved.

**Arkansas Medical Society Journal, Little Rock**
January, 1918, 14, No. 8

17 Experience at County Hospital; Report of Cases. A. L. Carmichael, Little Rock.—p. 159.
18 Shall Physician Tell the Truth? T. Cothern, Jonesboro.—p. 165.

**Boston Medical and Surgical Journal**
Jan. 31, 1918, 178, No. 5

19 Mental Conditions Disqualifying for Military Service. L. V. Briggs, Devens.—p. 141.
20 Vaginal Discharge in Children; Study of Two Hundred and Fifty-Five Selected Cases, with Special Reference to Question of Diagnostic and Specific Value of Smear Examinations. I. C. Rubin, New York.—p. 147.
21 Primary Lesion of Tuberculosis; Its Significance, Diagnosis and Treatment. W. W. Howell, Boston.—p. 152.
22 Lipoids in One Hundred and Thirty-One Diabetic Bloods. H. Gray, Boston.—p. 156.

**Georgia Medical Association Journal, Augusta**
January, 1918, 7, No. 9

23 Radium as Therapeutic Agent for Cancer of Cervix and Uterine Hemorrhages. O. D. Hall, Atlanta.—p. 177.
24 Southern Surgeons for Southern Soldiers. C. C. Harrold, Macon. —p. 183.
25 Exophthalmic Goiter; with Special Reference to Etiology and Roentgen Ray Treatment. W. A. Cole, Savannah.—p. 186.
26 Syphilis of Nervous System and Its Treatment. J. N. Brawner, Atlanta.—p. 190.
27 Relation of Focal Infections to Ocular Diseases. E. S. Osborne, Savannah.—p. 197.

**Journal of Cutaneous Diseases, Chicago**
January, 1918, 36, No. 1

28 Two Cases of Bowen Type of Epithelioma. H. Morrow and A. W. Lee, San Francisco.—p. 1.
29 Erythema Multiforme, Associated with Cutaneous Pigmentation (Melanin). E. W. Abramowitz, New York.—p. 11.
30 Case of Sclerema Neonatorum and Scleroderma. D. Lieberthal, Chicago.—p. 29.
31 Case of Acanthosis Nigricans Following Decapsulation of Kidneys. F. Wise, New York.—p. 35.

### Journal of Infectious Diseases, Chicago

February, 1918, **22**, No. 2


32 *Theory of Anaphylactic Shock. J. L. Kritchewsky, Moscow, Russia. —p. 101.
33 *Specific Precipitins in Gonococcal Infections. T. Watabiki, Tokyo, Japan.—p. 115.
34 *Brilliant Green as Bactericidal Agent for Purification of Vaccine Virus. C. Krumwiede, Jr., F. S. Fielder and T. A. Watson, New York.—p. 118.
35 *Determination of Numbers of Histidin Decarboxylating Organisms in Feces in Dementia Praecox as Compared with Numbers in Normal Feces. H. M. Jones, Chicago.—p. 125.
36 *Rôle of Specific Fats in Complement Fixation. C. C. Warden, Ann Arbor, Mich.—p. 133.
37 Experimental Vaccine Shock and Resistance to Tuberculosis. E. Sexsmith and W. Petersen, Chicago.—p. 142.
38 Relation of Serum Ereptase (Peptidase) Titer to Clinical Course in Pneumonia. W. Petersen and C. A. Short, Chicago.—p. 147.
39 Trypanosome of Panamanian Cattle and Method for Concentrating Trypanosomes in Peripheral Blood. O. Teague and H. C. Clark, Ancon, C. Z.—p. 154.
40 Piroplasmosis of Cattle in Panama. H. C. Clark, Ancon, C. Z.—p. 159.
41 *Epidemic Poliomyelitis. Isolation and Cultivation of Globoid Bodies. G. D. Heist, M. S. Cohen and J. A. Kolmer, Philadelphia.—p. 169.
42 *Id. Study of Opsonic Action of Poliomyelitic Serum on Various Organisms Isolated from Fatal Cases of Poliomyelitis. M. S. Cohen and G. D. Heist, Philadelphia.—p. 175.
43 *Id. Comparative Studies of Cocci Isolated from Poliomyelitis. G. D. Heist and M. S. Cohen, Philadelphia.—p. 182.


32. **Anaphylactic Shock.**—Kritchewsky undertook to solve the problem, whether the cotyledon juice which is able to precipitate animal serum and bacterial extracts, to agglutinate bacteria and blood corpuscles, and to lake the latter has the power to provoke the clinical and anatomic changes characteristic of anaphylactic shock, when introduced into the living animal. The experiments gave a positive answer. The guinea-pigs and rabbits which received the fluid intravenously died; the clinical picture and the anatomic changes were those of anaphylaxis. The shock and the death after injection of the cotyledon fluid are due to change in the degree of the disperseness of the plasma colloids.

33. **Precipitins in Gonococcal Infections.**—Watabiki studied the questions of precipitins in gonococcal infection, and in antigonococcus serum, also whether precipitation will distinguish between the gonococcus and the meningococcus, and whether it will permit the grouping of gonococci. He found that the serum of patients with gonococcal infection may contain specific gonococcal precipitates, but this seems to be the case when the infection has been severe and has lasted for some time. The serum of patients with typhoid or other infections, not gonococcal, does not contain gonococcal precipitin. The serum of rabbits injected with 8 strains of gonococci contained precipitin, each one for all the different gonococci; but in the case of 2 strains the extract gave precipitates in lower dilutions with the serum of the other six rabbits than with homologous serum, and their serum gave precipitates with the other six extracts in lower dilutions than the homologous extract. The serum of rabbits injected with the meningococcus, *M. catarrhalis* and the colon bacillus gave no precipitates with gonococcal extracts. Apparently antigonococcus serum is not as rich in specific precipitin as in agglutinins and complement-fixing bodies, but the precipitin reaction distinguishes more definitely between gonococci and meningococci, as well as *M. catarrhalis*, than complement fixation.

34. **Brilliant Green for Purification of Vaccine Virus.**—The data presented by the authors in this article show that brilliant green has little, if any, influence on the potency of vaccine virus, and added to the present glycerol-carbolic preservative, gives a more efficient and more rapidly bactericidal preservative.

35. **Histidin Decarboxylating Organisms in Feces.**—An organism similar to the one described by Berthelot and Bertrand has been isolated by Jones; it is shown to differ from *B. mucosus* by its inability to form gas and acid in glycerol broth. This organism, called *B. aminophilus*, does not form histamin from histidin when a more available source of carbon of the carbohydrates is present. A selective plating medium for isolating this organism from mixed culture has been devised. By this medium it was shown from an examination of samples from thirty-eight different stools, that *B. aminophilus* ordinarily is not found in the human intestinal tract in sufficient numbers to be isolated by direct plating of a quantity of feces representing from 20,000 to 100,000 living bacteria.

36. **Specific Fats in Complement Fixation.**—Warden says that the value of antigens in serum tests for the presence of antibody in gonorrhea, syphilis, typhoid, and cholera appears to depend on fatty complexes of definite chemical arrangement or configuration which represent the fatty content of the several micro-organisms causing those diseases. The reactions of the test are surface reactions and depend on the physical state of the antigen. The serum test as applied to tuberculosis is fallacious and unreliable probably because of the absence of sensitizers in the serums.

41. **Globoid Bodies in Epidemic Poliomyelitis.**—The authors record the isolation from human and monkey poliomyelitic material of four different strains of an organism which morphologically and culturally agrees in every particular with the descriptions of the globoid bodies of Flexner and his associates. It was observed that the macroscopic appearance of tubes of kidney-ascitic fluid medium which contain good growths of this organism differs from that of the uninoculated control tubes to such a slight degree that often inspection of the tube alone is of no value in determining the presence or absence of a growth.

42. **Opsonic Action of Poliomyelitic Serum.**—Cohen and Heist studied a number of streptococci and other bacteria from the brain, cord and internal organs of fatal cases serologically to see if serum from patients with poliomyelitis would give a specific opsonic reaction with any of them that might point toward its presence at some time in the tissues of the patient. In addition to and distinct from the globoid bodies, there is frequently present in poliomyelitic material a rather large streptococcus, occurring in short chains. The serums of a large precentage of patients with poliomyelitis give high opsonic indexes with this streptococcus, but not with streptococci from nonpoliomyelitic sources, nor with staphylococci, diphtheroids and gram-negative bacilli obtained from poliomyelitic material.

43. **Study of Cocci from Epidemic Poliomyelitis.**—Eight strains of cocci were isolated from poliomyelitic material, examined by the authors by elementary bacteriologic methods, and also by methods aimed to establish their more intimate functional relationships. None of these strains fermented inulin and they were all short chain streptococci, and that none of them produce hydrogen sulphid, would serve to exclude them from any of the Andrewes and Horder's types except *Streptococcus milis* or *Streptococcus salivarius*, the common habitat of both of which is the human mouth.

### Laryngoscope, St. Louis

January, 1918, **28**, No. 1


44 Treatment of Suppuration of Accessory Sinuses of Nose. E. B. Gleason, Philadelphia.—p. 1.
45 Lymph Angioma of Larynx. C. W. Richardson, Washington, D. C.—p. 8.
46 Etiology of Speech Defects. M. K. Scripture, New York.—p. 12.
47 Mechanical Spoon for Esophagoscopic Use. C. Jackson, Philadelphia.—p. 47.
48 Esophagoscopic Forceps. C. Jackson, Philadelphia.—p. 49.
49 Improved Snare. C. B. Harwood, Houston, Texas.—p. 50.


### Maine Medical Association Journal, Portland

January, 1918, **8**, No. 6


50 Can We Prevent Gastric Cancer? R. F. Chase, Portland.—p. 163.
51 First Aid to War Wounded. W. W. Robinson, Portland.—p. 166.


### Medical Record, New York

Feb. 2, 1918, **93**, No. 5


52 Problems of Drug Addiction. C. L. Dana, New York.—p. 177.
53 Initial World War Material at Army Medical Museum. R. W. Shufeldt, Washington, D. C.—p. 179.
54 Venereal Diseases; Their Relations to Insanity and Nervous Diseases. J. J. Kindred, River Crest, Astoria, L. I.—p. 184.
55 Autointoxication—Etiologic Factor of Neuroses of Children. W. R. Woodbury, Rochester.—p. 185.
56 Sanitary Condition of Mikvehs and Turkish Baths. W. A. Manheimer, New York.—p. 189.
57 Complement Fixation in Tuberculosis. W. Meyer, West Hoboken, N. J.—p. 193.

### New York Medical Journal

Feb. 2, 1918, 107, No. 5

58 Carrel Treatment of Wounds of War. F. Le M. Hupp, Wheeling, W. Va.—p. 193.
*59 Psychologic, Physiologic and Pharmacologic Basis of Nicotinism, Alcoholism and Morphinism. J. L. Tracy, Toledo, Ohio.—p. 197.
60 Postoperative Tetanus. M. Behrend, Philadelphia.—p. 199.
61 Nonsurgical Treatment of Cancer. A. C. Geyser, New York.—p. 203.
62 Analysis of Seven Cases of Friedreich's Ataxia. M. Osnato, New York.—p. 204. To be concluded.
63 Active Immunization Against Diphtheria. J. Blum, New York.—p. 208.

### South Carolina Medical Association Journal, Greenville

January, 1918, 14, No. 1

64 Cysts of Pancreas. J. R. Sparkman, Columbia.—p. 5.
65 Abdominal Pain. B. B. Steedly, Spartanburg.—p. 10.

### Southern Medical Journal, Birmingham, Ala.

January, 1918, 11, No. 1

66 Physicians and Healers. G. Dock, St. Louis.—p. 1.
67 *Chemical Analysis of Blood as Index to Treatment. J. S. McLester, Birmingham.—p. 14.
68 Teaching of Clinical Neurology. T. A. Williams, Washington, D. C.—p. 17.
69 Public Health in War Times. E. G. Williams, Richmond, Va.—p. 21.
70 War in Its Effects on Development of Tuberculosis. C. L. Minor, Asheville, N. C.—p. 24.
71 County Health Organization. A. T. McCormack, Bowling Green, Ky.—p. 29.
72 Traumatic Brain Surgery. J. W. Long, Greensboro, N. C.—p. 31.
73 Some of Common Errors in Gynecology. F. W. Griffith, Asheville, N. C.—p. 40.
74 Attitude of Railway Surgeon and His Relation to Claims Department. J. M. Burke, Petersburg, Va.—p. 42.
75 General Surgery in Army. W. H. Moncrief, Washington, D. C.—p. 45.
76 Changed Conditions in Practice of Ophthalmology and Otology Due to War. T. W. Moore, Huntington, W. Va.—p. 49.
77 Secondary Hemorrhage Following Submucous Resection Six Days after Operation. D. C. Montgomery, Greenville, Miss.—p. 49.
78 Medical Preparedness in Great Drive for Democracy. J. C. Bloodgood, Baltimore.—p. 51.

67. Abstracted in THE JOURNAL, April 28, 1917, p. 1287.

### Southwest Journal of Medicine and Surgery, El Reno, Okla.

January, 1918, 26, No. 1

79 Cesarean Section as Life Saving Procedure in Puerperal Eclampsia. J. A. Foltz, Fort Smith, Ark.—p. 1.
80 Use of Lumbar Puncture in Puerperal and Postpartum Eclampsia. W. T. Wilson, Navasota, Texas.—p. 5.
81 What the Superintendent of Hospital Means to Scientific Medicine. C. S. Pettuss, Little Rock, Ark.—p. 15.

### Surgery, Gynecology and Obstetrics, Chicago

February, 1918, 26, No. 2

82 *Excision of Vesical Diverticula after Intravesical Invagination by Suction: New Method. H. H. Young, Baltimore.—p. 125.
83 Premature Separation of Normally Implanted Placenta in Two Cases. A. H. Morse, New Haven, Conn.—p. 133.
84 *War Wounds of Knee-Joint among French Soldiers. J. R. Judd, Honolulu, Hawaii.—p. 139.
85 *Dichloramin-T. E. K. Dunham, New York.—p. 152.
86 *Use of Dichloramin-T in Treatment of Infections and Infected Wounds. W. E. Lee and W. P. Furness, Philadelphia.—p. 155.
87 *Ascending Urinary Infections; Experimental Study. V. C. David, Chicago.—p. 159.
88 *Experimental and Clinical Study of Chloroform, Ether and Nitrous Oxid-Oxygen in Pregnancy and Labor. C. H. Davis, Chicago.—p. 170.
89 Combined Bacteriologic and Histologic Study of Endometrium in Health and in Disease. A. H. Curtis, Chicago.—p. 178.
90 Colon Bacillus Infection, Extragenital, Complicating Pregnancy and Puerperal State. E. P. Davis, Philadelphia.—p. 189.
91 Rider's Tendon; Rupture of Adductor Tendons of Thigh. W. T. Davidson.—p. 192.
92 Experimental Physiologic Action of Ovarian Extracts. G. P. Gonalons.—p. 196.
93 Acute Diverticulitis of Colon. J. F. Erdmann, New York.—p. 207.
94 Recognition and Treatment of Intestinal Diverticula. D. Roberts, Brooklyn.—p. 211.
95 One year's Experience (1916) with Gunshot Wounds of Abdomen at Memphis General Hospital; Report of Fifty Cases. M. Goltman, Memphis, Tenn.—p. 217.
96 Treatment of Fractures by Suspension and Extension. J. E. Cannaday, Charleston, W. Va.—p. 226.
97 *Simple Method of Performing External Perineal Urethrotomy J. D. Barney, Boston.—p. 232.
98 Action of Radium on Cancer. H. H. Janeway, New York.—p. 233.
99 Modified Uterine and Viscera Forceps for Careful Manipulation of Tissue. A. J. Schoenberg, Chicago.—p. 237.
100 Experience in Glasgow Royal Maternity and Woman's Hospital in Summer of 1916. W. F. Hewitt, Chicago.—p. 238.

**82. Excision of Vesical Diverticula.**—The invagination of diverticulum by suction and traction is done by Young as follows: The diverticular orifice is investigated, and if necessary dilated with forceps. Into this orifice a glass tube is inserted to the full depth of the diverticulum, and immediate suction with an electric air pump is commenced. It is usually evident, almost at once, that the mucous membrane has been drawn against the orifice, and the tube is then drawn very slowly outward, a small distance, the suction being continued until the mucous membrane of the diverticulum is seen coming upward inside of the glass tube. Not infrequently the mucous membrane reaches a point 1½ to 2 inches above the bottom of the tube. The glass tube is then slowly drawn out, bringing the diverticular mucosa with it, and as soon as the end of the tube is outside of the diverticular orifice, the mucous membrane is caught with a toothed clamp, and the glass tube then removed. The intravesical delivery of the diverticulum is then completed by traction, the operator using sharp-toothed clamps applied at various points around the circumference, and then possibly further dilating the diverticular orifice in case the sac is very large and difficulty is experienced in delivering the whole diverticulum through the small orifice. As soon as the entire diverticulum has been turned inside out within the bladder, a circular incision is made through the mucous membrane around the neck of the diverticulum and the mucous membrane elevated at one point. Then, by blunt dissection, it is a simple matter to peel away and remove in one piece the entire lining membrane of the diverticular sac, the excised tissue consisting merely of mucosa and submucosa.

**84. War Wounds of Knee-Joint.**—Judd points out that the resisting powers of the synovia and ankylosing tendencies vary in individuals. In the presence of an infected projectile and infected joint fluid, the synovia may still be uninfected for a certain period. Fissures extending to the articular surface are important and are often unrecognized. Secondary infection of the ankle-joint sometimes occurs unexpectedly and is a grave complication. The earlier methods of noninterference, drainage tubes, and wholesale removal of bone have yielded disastrous results. The mortality has been greatly reduced by improved methods of treatment. Perforating wounds traversing the joint should be treated by puncture, compression and immobilization. For wounds with foreign bodies included, with or without bony lesions, early intervention is the secret of success. The new era in knee-joint surgery calls for arthrotomy within forty-eight hours, removal of projectile, foreign bodies and loose fragments, excision of path of projectile, cleansing of joint and suture without drainage. Extensive bony lesions demand primary resection. From all points of view vital preservation of the limb and its function and duration of hospital stay, the results of the improved method are vastly superior.

**85. Dichloramin-T.**—Dunham says that dichloramin-T is so slightly soluble in water that aqueous solutions must necessarily be ineffective, although the reactivity of the compound is extremely high. But solutions in oil can be used in great concentration, up to 20 per cent. if need be, thus introducing an extraordinary mass of antiseptic at a single application. And this abundant and apparently excessive mass can become effective, without undue irritation. When an oil solution of dichloramin-T is brought into contact with an aqueous medium, a portion of the active chlorin passes from the oil into the latter, and the amount so transferred depends on the character of the substances contained in the aqueous medium, particularly their ability to take up chlorin. Three experiments are cited in illustration: A 6.5 per cent. solution of dichloramin-T in eucalyptol and liquid petrolatum was shaken with, respectively, equal volumes of physiologic sodium chlorid solution, of muscle extract and of blood serum. After standing for three hours, the oil was completely separated and the active chlorin in the aqueous portion determined. The results, expressed in terms of dichloramin-T, were: 1:6,000

in the saline; 1:300 in the muscle extract, and in the serum, which was mostly coagulated, 1:111.

86. See THE JOURNAL, Sept. 29, 1917, p. 1076.

87. **Ascending Urinary Infections.**—Evidence is presented by David to show that ascending *Bacillus coli* infection of the upper urinary tract from the bladder travels most frequently by the lumen of the ureter. Periureteral infiltration is present only when peritoneal exudate of the bladder or pelvic peritoneal exudate is also present. Periureteral or subpelvic exudate is not synonymous with infection of the urinary stream. In the presence of periureteral or subpelvic infiltration the kidney parenchyma is negative in most instances. The infection of a hydronephrosis where the ureter is ligated and divided and comes in contact with infectious material may take place by spreading through periureteral lymphatics to the subpelvic fat and by contiguity involve the pelvis of the kidney.

88. **Chloroform, Ether, Nitrous Oxid-Oxygen in Labor.**—Since it is evident that anesthesia during pregnancy may be a source of considerable danger to the fetus, Davis believes that operations should be avoided, if possible, during this period. The fetus in utero and the new-born would appear to stand ether anesthesia better than chloroform or nitrous oxid-oxygen.

97. **Method of Performing External Perineal Urethrotomy.**—A soft rubber catheter, well lubricated, and of suitable size, is passed through the penis into the bladder until the outer end of the catheter is almost level with the external meatus or the end of the urethra (as the case may be). The catheter is seized 0.5 cm. from its outer end with a half curved clamp of appropriate size and length. The clamp is passed down the urethra, its convexity against the roof, until its point is felt pressing against the floor of the bulb. The catheter has meantime been pushed ahead of the clamp and coiled in the bladder. The point of the clamp is now made to impinge against the perineum, bulging it outward in the median line. The urethra is opened at this point by an incision, which need not be more than 1 cm. in length, and the end of the clamp, still grasping the catheter, easily merges through the wound. The clamp is opened and withdrawn upward through the urethra and the catheter is drawn outward through the perineal incision until its eye lies correctly in the bladder. It is secured in place by a coarse silkworm-gut suture passed through the edges of the perineal wound and tied tightly around the catheter. Constant drainage of the bladder is thus established by connecting the catheter with a bottle by the bedside, or simply by letting it lie in a urinal which the patient keeps between his legs in bed.

### Texas State Journal of Medicine, Fort Worth

January, 1918, 13, No. 9

101 Etiology of Winter Hay-Fever in Texas. S. N. Key, Austin.—p. 308.
102 Control of Diphtheria in Small Town. J. R. Elliott, and H. H. Loos, Palacios.—p. 309.
103 Surgery of Bones and Joints; with Especial Reference to Tuberculosis. C. M. Rosser, Dallas.—p. 311.
104 Pneumonia. O. W. Ross, Leona.—p. 314.
105 Surgery of Deformities of Spine. C. S. Venable, San Antonio.—p. 316.

## FOREIGN

Titles marked with an asterisk (*) are abstracted below. Single case reports and trials of new drugs are usually omitted.

### British Medical Journal, London

Jan. 12, 1918, 1, No. 2976

1 *Orthopedic Outlook in Military Surgery. R. Jones.—p. 41.
2 Separate Suture of Nerves in Nerve Trunks. J. N. Langley.—p. 45.
3 *Antenatal Syphilis: Suggested Action of Chorionic Ferments. A. J. Routh.—p. 47.
4 Course of Instruction in Venereal Diseases. D. Watson.—p. 48.
5 *Suggestions Toward Systematic Operative Treatment of Gunshot Wounds of Mandible. W. Trotter.—p. 49.
6 Solvents for Dichloramin-T. H. D. Dakin and E. K. Dunham.—p. 51.
7 *Skin Ink for Radiography. N. S. Finzi.—p. 52.
8 Drainage vs. Scraping in Operation of Curettage of Uterus. G. S. Thompson.—p. 53.

January 19, No. 2977

9 *Medical Aspects of Aeroplane Accidents. H. G. Anderson.—p. 73.
10 *Acute Yellow Atrophy in Syphilis. S. McDonald.—p. 76.
11 *Pericardial Knock. S. M. Smith.—p. 78.
12 Simple Apparatus for Nitrous Oxid-Oxygen Anesthesia. A. S. Wilson.—p. 78.
13 Anesthetics in Military Hospitals. T. Clarke.—p. 79.
14 *Treatment of Gunshot Wounds with Solution of Soap and Water and Primary Suture. J. B. Haycraft.—p. 80.
15 Serologic Investigation of Vincent's Angina. F. E. Taylor and W. H. McKinstry.—p. 82.

1. **Orthopedic Outlook in Military Surgery.**—The fact that about 50 per cent. of the wounded of this war have received injuries resulting in impairment of locomotor function and usefulness of limbs, Jones says, has brought the importance of orthopedic principles and methods of treatment into a prominence which no one had foreseen. In England the first orthopedic center was established in Liverpool, with a view of concentrating under one roof a staff trained in orthopedic principles and an equipment which could provide for all the stages of treatment necessary for the restoration of function. There now are sixteen centers in the British Isles containing close on 15,000 wounded. Of the men treated in these centers 75 per cent. have been returned to the army. An orthopedic center consists of: 1. A staff of surgeons who have had previous experience of the detail of orthopedic work, both operative, manipulative and educational. They plan the complete course of treatment. 2. Men with experience in operative surgery who, though not specializing in the work, are interested in it, and only need experience to fit them to take charge of wards in new centers as they are formed. 3. Still younger men who will ultimately go abroad. 4. The hospital further consists of a series of auxiliary departments, each under a medical man who has experience of the particular methods of the treatment he directs. These departments are the electric, the massage, the hydrologic, the gymnastic, and the curative workshops. The successful working of an orthopedic center depends on the coherent association of all departments in carrying out the plan of campaign mapped out by the surgeon when he sees the patient. The orthopedic problem is divided into two distinct parts—preventive orthopedics and corrective orthopedics. The latter is more especially the department of the trained orthopedic surgeon. The preventive requires the help of every surgeon who has to treat wounded men at any stage, especially the early stage.

3. See abstract No. 20, THE JOURNAL, Feb. 16, 1918, p. 491.

5. **Operative Treatment of Gunshot Wounds of Mandible.**—For considerations of treatment these cases may be conveniently divided into three classes: (1) fractures without considerable loss of substance, actual or probable; (2) fractures with considerable loss of substance, either actual from immediate destruction or probable from necrosis, but with the superficial soft parts more or less intact; (3) fractures with considerable destruction of bone and of the overlying soft parts—cases in which the bone and lower part of the face are "blown away." The first class obviously lends itself to treatment by intrabuccal fixation, and may be expected to give results almost as good as those of the ordinary fractured jaw of civil practice. The second class seems to be an especially common and troublesome type, and perhaps to lend itself to a more radical and systematic treatment than it usually receives. In cases in which large parts of the bone have had to be removed, the plastic reconstruction of the jaw has not proved to present insurmountable difficulties as a rule, and grafts, taken almost invariably from unaffected parts of the jaw itself, have been found an easy and satisfactory method of reestablishing the continuity and stability of the bone. As in these cases some part of the thickness of the bone usually is available for use as a graft, even in the affected region, the two-stage operation is not often necessary. The primary and immediate operation giving full access to the fracture with the purpose of limiting hemorrhage, sepsis and necrosis and attaining a limited and relatively aseptic scar, is an indispensable preliminary to a systematic application of plastic bone surgery to large destructive lesions of the mandible. If the surgeon keeps clearly in mind the principle that protection of raw surfaces in order to secure rapid

union must be the first consideration, the minor procedures that facilitate this will suggest themselves readily.

7. **Skin Ink for Radiography.**—The formula used by Finzi is as follows:

| | gm. or c.c. |
|---|---|
| Acid. pyrogallic | 1 |
| Spirit. vini meth. | 10 |
| Liq. ferri perchlor. fort. | 2 |
| Acetone | ad. 20 |

This gives a concentration of 5 per cent. pyrogallol and 2 per cent. iron. The solution is best kept in a bottle with a camel's-hair brush attached to the cork so that it can easily be painted on. The mark is a brownish gray at first, but after a few hours turns a brilliant black.

9. **Aeroplane Accidents.**—Scheme for first aid at an air station: The steward on being notified of an accident dispatches the ambulance, which stands always in readiness by the sick-bay, to the scene of the accident. Two sick berth attendants go with the ambulance, and with them is a bag containing the following articles: (1) morphin solution and two Wildey's hypodermic syringes; (2) a bottle of chloroform and face mask; (3) brandy; (4) a bottle of sterilized water; (5) six first-aid field dressings and slings; (6) picric acid dressings; (7) a tourniquet, cloth cutting scissors and a knife. The surgeon on duty is on the aerodrome during flying hours, and proceeds to the scene of the accident by car or foot. If the accident is at a distance, a mile or more, it is better to go by aeroplane. Anderson has now gone by air to cover thirty forced landings and accidents at a distance, and is convinced of the utility of this method in arriving quickly and not otherwise tired and out of breath after a long run. Officers and flight mechanics sent to the scene of the accident should be trained in first aid with special reference to aeroplane accidents.

The aeroplane seat cushion is taken from the machine and placed under the injured pilot's head, while his body rests on a flying coat spread out on the ground. A rapid examination is carried out to determine the injuries received. If the injured person is conscious and in much pain, morphin should be injected and he should be conveyed quickly to the dressing station, where clothes can be cut away, injuries examined, and treated accordingly. If unconscious, some cutting away of clothing can be done on the field, injuries examined, and perhaps a dislocation reduced or a fracture accurately diagnosed during the unconscious period. The pilot's leather clothing for a time usually protects the body, but the face and lower limbs rarely escape. As the pain is so severe, and this applies to other injuries apart from those caused by fire, it is better to give chloroform on the field, and this is kept up on the way back to the dressing station. Morphin should also be given, but it takes some time to act.

10. **Acute Yellow Atrophy in Syphilis.**—During the past two months McDonald has seen five typical cases of acute yellow atrophy in the postmortem room. In an experience of over 5,000 postmortem examinations performed since 1898 McDonald has only investigated one other case. The present series of five cases have all occurred in syphilitic subjects in the course of, or subsequent to, treatment by salvarsan preparations and mercury. In practically all the cases a full course of intravenous injections of salvarsan had been given, coupled with the usual intramuscular injections of mercury. In each case the diagnosis of syphilis was confirmed by a Wassermann test. These cases were not of undue severity, and showed no special symptom of importance till a sudden onset of jaundice was noticed, without at first any special disturbance, the disease suggesting nothing more than an ordinary catarrhal jaundice. At a varying period of from two to eight days, however, acute symptoms appeared with suddenness. They were ushered in by a period of wild excitement and increased icterus, with hematemesis. The patients rapidly passed into a condition of deep coma, and death occurred in the five patients at periods of one to four days from the onset of the acute symptoms. The urine was markedly bile stained, and in each patient showed tyrosin; in some leucin was also demonstrated. In four of the cases diminution in the size of the liver was demonstrated during life.

11. **Pericardial Knock.**—There is a sound heard on auscultation in cases of penetrating wounds of the chest near the cardiac region which is unlike anything met with in civil practice. It is of the nature of a click, and varies from a faint sound heard by careful auscultation, to a noise which may be compared to that heard in the ear piece of a telephone when the lever is moved up and down. It may be heard sometimes when standing at the foot of the patient's bed. Sometimes the patient is conscious of it, and on one occasion called Smith's attention to it. In nearly every case the sound disappeared after forty-eight hours, although in one patient who was recovering from a chest wound without any complications the sound persisted for ten days. The sound has been, as a rule, most marked near the apex beat. It is usually double, corresponding to the heart sounds, and its intensity waxes and wanes with respiration, sometimes disappearing completely in full expiration. A distinct fremitus can be felt by the hand laid on the chest. It has been suggested that the sound is due to emphysema of the connective tissue of the mediastinum. The usual disappearance of the sound after a short period, and the absence of serious symptoms in many cases, suggest that it may be due to air in the interstitial connective tissue of the lung which is struck on by the beats of the heart.

14. **Gunshot Wounds Treated with Soap and Water.**—The solution used by Haycraft has been of the strength 1 in 40. Pure sapo durus (1 part), obtained in blocks, is cut into shavings and dissolved in hot water (20 parts) which has been previously boiled. When required for use the solution is mixed with an equal volume of sterile water. Superficial wounds are completely excised and soap solution well rubbed into the surface; they are then stitched up. Single penetrating wounds: The skin wound is completely excised, the exposed surface of the wound in the muscle cut away, and the track of the missile laid thoroughly open. The wound being held widely open with retractors, the surface of the track is cut away all 'round, from the inside, with scissors until all damaged muscle, so far as it is visible to the naked eye, is removed. Foreign bodies, clothing, or any small, loose fragments of bone, are removed, all bleeding points ligatured, and the whole wound thoroughly swabbed out with soap solution. Muscles and fasciae are closed with catgut and the skin sutured. If the metal has passed almost through the thickness of a limb, it is removed by a counter incision and the wound converted into a seton wound.

Seton wounds: Both entrance and exit wounds are treated as above, and it is generally possible in this manner to expose and excise the whole track, one half from each incision. In cases in which this has been impossible for anatomic reasons the center of the track has been well rubbed with gauze and soap. If it only involved the division of a thin layer of muscle, the entrance and exit wounds were directly connected, laying open freely the whole track, which could then be dealt with. If there is gross loss of muscular tissue so that the ends cannot be approximated, or if a large dead space is left, the skin is sutured over the wound and a very small split rubber tube introduced for twenty-four to forty-eight hours. In cases in which it is difficult to approximate the skin edges without undue tension one or more incisions may be made down to the deep fascia parallel to and at some distance from the wound. This occurs most often in the forearm and lower part of the leg. Amputations have been completely stitched up with a very small split tube introduced into one corner for twenty-four hours. Penetrating wounds of knee-joints have been completely excised down to the synovial membrane, the joint well irrigated with soap solution, and the wound closed in layers. The effect of the soap solution on the wound appears to be hemostatic. Instruments, needles, etc., tend to become somewhat slippery—a slight disadvantage.

Out of a total of 98 cases in which the result was observed, 91 eventually healed and 7 failed altogether. Out of 38 cases of compound fracture, 33 eventually healed and 2 failed. A considerable proportion of cases healed dry without any discharge. A few cases became very swollen, red and shiny about the second day, simulating acute cellulitis. After a

day or two the swelling began to subside, redness disappeared and the skin became crinkled, due to diminution of subcutaneous edema. Haycraft says that these cases may cause alarm at first, but it is rarely necessary to remove any stitches. In some cases in which the wound was gangrenous before operation a brownish discoloration appeared around the wound, and the part might even become tympanitic. On removal of one or two stitches gas and offensive discharge escaped, and the infection as a rule subsided.

### Edinburgh Medical Journal

January, 1918, **20**, No. 1

16 Cerebrospinal Fever. P. W. Maclagan.—p. 3.
17 Two Child Welfare Schemes. G. H. G. Dundas.—p. 26.
18 Training of Student of Medicine. J. Mackenzie.—p. 31.
19 Teaching of Chemistry to Students of Medicine. J. Walker.—p. 48.

### Medical Journal of Australia, Sydney

Jan. 5, 1918, **1**, No. 1

20 *Appearances of Lungs after Death from Asphyxia and Reasons. W. F. Litchfield.—p. 1.
21 Reeducation of Disabled Soldier. H. R. G. Poate.—p. 2.
22 Modern Treatment of Gonorrhea. L. E. Ellis.—p. 5.
23 Inguinal Colostomy. R. H. Russell.—p. 7.

**20. Appearances of Lungs after Death from Asphyxia.**—Litchfield says that after death from what might be called dry asphyxia, the lungs are light, dry and bloodless, while after death from drowning the lungs are heavy, wet and more or less engorged, although this wetness is not due to inspired water. Litchfield's hypothesis is that in dry asphyxia, the right heart fails before the left, and so the lung is sucked dry of blood, while in drowning the left heart fails before the right, with the result of engorgement and edema of the lungs. In dry asphyxia, owing to the negative pressure in the lungs, the dyspnea is predominantly inspiratory; blood is sucked into the thorax; the right heart becomes distended to the bursting point, and its function paralyzed; while the left heart is still able to beat. In drowning, when water on inspiration strikes the larynx and upper air passages, violent expiratory effort or coughing is induced, and the dyspnea becomes mainly expiratory, with the result that the right heart does not become so intensely gorged that it cannot beat, and in the meantime the left heart fails before the great increase of systemic arterial blood pressure, which is a constant feature in asphyxia.

### National Medical Journal of China, Shanghai

December, 1917, **3**, No. 4

24 *Active Immunity to Systemic Plague Infection. F. Eberson.—p. 125.
25 Two-Stage Operation in Large Ovarian Cysts. W. B. Russell.—p. 140.
26 Parasitology of Dysentery. E. S. Tyau.—p. 142.
27 Value of Scientific Study of Botany to Chinese Medical Students. W. M. Porterfield, Jr.—p. 148.

**24. Active Immunity to Systemic Plague Infection.**—The close relationship of the phenomenon of antianaphylaxis and that of resistance to proteotoxins suggested to Eberson the feasibility of applying the facts concerning the former to a method involving apparently similar principles. He assumed that repeated injection of proteotoxin, if this contained specific substances of the plague organism, would give rise to an immunity toward plague itself. Experiments were made on animals. The treatment of rabbits with proteotoxins obtained with *B. pestis* confers a definite resistance on the part of the animal to systematically introduced plague organisms. The apparent immunity protects in at least 75 per cent. of the animals treated, taking the entire number of cases into consideration. Below a certain dose of bacteria, the protection conferred is much greater. Combined intravenous and intraperitoneal injections of the proteotoxin seem to be more effective than either method by itself, although intraperitoneal treatment of rabbits results in a powerful resistance to plague bacteria administered by that route. The immunity, in so far as it has been possible to determine it in these experiments, is definitely marked for at least one month after treatment. Injections given at intervals of two to three weeks give rise to a definite resistance to inoculation with living, virulent plague. *B. pestis* appears to be the matrix for a specific poisonous substance analogous to proteotoxin, if not identical with it, and capable of inducing in the animal body a specific resistance to the organism which is used in the manufacture of the toxic element. Eberson's observations support the hypothesis that one of the most potent factors in the protective mechanism is that of leukocytosis.

### Archives des Maladies du Cœur, etc., Paris

December, 1917, **10**, No. 12

28 *Functional Capacity of Right Heart. L. Calandre.—p. 561.
29 *Cardiovascular Disturbances in Typhus. D. Danielopolu.—p. 571.

**28. Sign of the Functional Capacity of the Right Heart.**—Calandre remarks that most of the tests applied to determine the functional capacity of the heart are addressed to the left side of the heart. By the time that the heart is dilated and there is cyanosis, the right heart is much damaged. One of the earliest evidences of insufficiency of the myocardium is the relaxing of that state of semicontraction which every sound muscle presents even in repose. Calandre has noticed that this early relaxing modifies the venous pulse in a certain way, as he shows by some typical tracings. In normal conditions the venous pulse shows three waves, the *a*, *c* and *v* waves. With a slow heart beat, during diastole, in addition to the three normal waves, the *a*, *c* and *v* waves, a fourth wave, Gibson's *h* wave, the *s* wave of different authors appears. This *s* wave appears between the last *v* wave and the commencement of the next revolution, that is, during the resting phase of the heart. When the heart is clinically sound this *s* wave is not modified by the respiration. With a myocardium that has lost some of its tonus this *s* wave does not appear when inspiration coincides with the resting phase of the heart, during which the *s* wave otherwise occurs.

**29. Cardiovascular Disturbances in Typhus.**—Danielopolu found that the myocardium and the suprarenals suffered more than any other organs in his experience with 500 cases of typhus in military and civilian circles in Roumania in 1917. Various forms of arrhythmia were common, and the arterial pressure was often abnormally low. He found most effectual treatment with strophanthin by the vein. Digitalis was much less reliable, and no benefit followed the use of camphor. Strophanthin has an undoubted cumulative action. He gives it in doses of two or three tenths of a milligram, repeated two or three times a day. In these small doses it has no diuretic action, and has to be supplemented with theobromin. He has given thousands of these injections with no mishap. He begins them at the first symptoms of myocardium insufficiency, and keeps them up until the normal rhythm is restored, lengthening the intervals. He used the drug made from the *Strophanthus gratus*. The low blood pressure was combated with epinephrin in comparatively large doses. Associated with strychnin, it gave good results in the intense and prolonged asthenia of toxic forms of the disease. The effect of the epinephrin was fleeting.

### Archives de Médecine et de Pharmacie Militaires, Paris

May, 1917, **67**, No. 5

30 *Heliotherapy for War Wounds. A. Aimes.—613.
31 The Radiologic Services in the Army. A. Charlier.—p. 638.
32 *The Negatoscope. L. Bois.—p. 652.
33 Suture under Bacterial Control. G. Picot and R. Michel.—p. 657.
34 Conference of the Chiefs of the Dermato-Venereologic Centers. O. Pasteau.—p. 676.

**30. Heliotherapy for War Wounds.**—Aimes remarks that direct sunlight as an adjuvant in treating war wounds is seldom correctly utilized. Experience has confirmed beyond question the value of heliotherapy supplementary to operations, the relief of local pain and the general soothing influence, and the subsequent normal aspect and functioning of the muscles. It has materially hastened the healing of burns in his experience, but for this the rays must have direct access to the tissues. The exposures for heliotherapy should be direct and total, without interposition of gauze, glass, petrolatum or any fat salve. He insists that the whole body must be exposed in all forms of surgical tuberculosis. With nontuberculous affections, extensive regional exposures may suffice. The head should always be carefully protected with

a broad brimmed hat, an umbrella or hood over the head of the bed or litter. The body should be absolutely naked; if this is not possible, the region should be largely exposed, especially the glands in the region as they are actual reservoirs of bacilli. He begins very gradually, the first day exposing the feet alone, for five minutes at three sittings with at least an hour's interval. By the fifth day he is giving three exposures, the feet thirty minutes, the legs twenty, the thighs fifteen, the abdomen ten and the forearm five minutes. The thorax also is exposed for five minutes the seventh day, protecting the heart region. By the twelfth day three total exposures of an hour with only half an hour for the trunk and neck. After the third month the whole body can be exposed for several hours. With tuberculous bone lesions, immobilization is indispensable. Bivalve plaster casts are preferable and all casts should be carefully supervised. As the sun's rays are bactericidal, antiseptic dressings are seldom needed. Dry dressings or artificial serum are excellent. Wire netting to protect the wound while allowing its exposure to sun and air is often useful. Except in excessively smoky cities, heliotherapy can be applied anywhere, and in the aftercare of the wounded may render immense services.

32. **The Negatoscope.**—The apparatus here illustrated is arranged to show radiographic negatives at a glance. It is especially useful during an operation, the surgeon thus having before his eyes the radiographic findings.

### Bulletin de l'Académie de Médecine, Paris

Dec. 29, 1917, **78**, No. 50

35 *The Bolting of Wheat Flour. E. Maurel.—p. 799.
36 Paratyphoid B Bacilli in Shellfish. G. Daumézon.—p. 806.
37 *Film Dressings for Burns. F. Fremiet and Pfulb.—p. 809.
38 *Gas Treatment of Scabies, etc., in Animals. T. A. Clayton.—p. 811.

35. **White and Whole Wheat Bread.**—Maurel presents testimony to show that whole wheat bread is not digested and assimilated as well as that made from the intermediate grade of wheat flour, bolted to 75 or 85 per cent. The whole wheat bread is useful to combat constipation. Flour bolted less than 70 per cent. is useful for persons with overexcitable digestive tract as it tends to constipate. Aside from these groups, and hence including the majority, the persons with normal digestion, bread made from flour bolted to 75 or 85 per cent. is the best utilized by the organism.

37. **Healing Under a Film Dressing.**—Fremiet and Pfulb state that in case of burns under a film dressing there is a continuous passage outward of leukocytes, traversing the granular tissue, while the film dressing forms a protecting barrier. The consequence is that the infectious processes are limited to the superficial layers and healing proceeds aseptically by the simple play of the normal defenses of the organism without the aid of antiseptics.

38. **Clayton's Gas Applied in Treatment of Scabies and Other Skin Diseases and Vermin in Man and Animals.**—See Paris Letter, p. 476.

### Journal de Médecine de Bordeaux

December, 1917, **88**, No. 14

39 Criminal Abortion and Professional Secrecy. H. Berthélemy.—p. 291; Fieux.—p. 295.
40 *Subacute Melancholia in Soldiers. (Le cafard.) J. Caussimon.—p. 298.
41 *Sodium Sulphate. P. Carles.—p. 300.

40. **Subacute Melancholia.**—The soldiers call these attacks of a combination of grouch, worry and depression, the *cafard*. It is not neurasthenia nor psychasthenia; there is no neuralgia or rheumatism or heart disturbance, but vasomotor phenomena are common. This suggests that disturbance in the circulation in the brain or medulla from some vasomotor spasm may be responsible for this recurring form of the "blues."

41. **Test for Arsenic in Sodium Sulphate.**—Carles warns that when sodium sulphate forms a turbid solution with distilled water there is probably arsenic left in it. This can be revealed by adding 5 gm. of sulphuric acid and an equal amount of zinc to 100 gm. of distilled water. The vessel is then capped with a white filter paper cap. This piece of paper, about 4 or 5 inches in diameter, is moistened with a 1 per cent. solution of mercuric chlorid and dried before it is used. The edges of the paper are turned down over the neck of the bottle and it is held firm with a tumbler or salve box turned upside down or a piece of glass. If the paper is still white by the end of forty or fifty minutes, the reagents are certainly pure. Then about 25 gm. of the sodium sulphate is placed in the bottle and the whole agitated as it dissolves. If there is arsenic present, the paper will turn yellow and then brown, the depth of the tint proportional to the arsenic content. The discoloration is caused by the arseniated hydrogen formed by contact with the nascent hydrogen. Carles is confident that this test will be found useful for detecting minute amounts of the poison in various drugs. It reveals the arsenic even with as small a content as one hundredth of a milligram per cent. He found this test particularly useful in detecting arsenic in cream of tartar.

### Lyon Chirurgical

September-October, 1917, **14**, No. 5

42 *Intracranial Foreign Bodies. C. Villandre.—p. 793.
43 *A Year After Trephining. J. Murard.—p. 810.
44 *Hernia of the Brain. G. Aigrot.—p. 814.
45 *Fracture of the Jaw. P. Japiot.—p. 823.
46 *Paul's Tube for Colon Operations. C. G. Cumston.—p. 849.
47 *Secondary Resection of the Elbow. G. Leclerc.—p. 853.
48 *Bone Resection for Muscular Retraction. Thévenet.—p. 865.
49 *Ankylosis of the Elbow. Thévenet.—p. 871.
50 *Osteochondritis after Pleurotomy. Thévenet.—p. 877.
51 Postseric Tetanus. Jullen.—p. 879.
52 *Experimental and Clinical Grafting Operations. R. Ingebrigtsen.—p. 884; M. Le Jemtel.—p. 895; E. Greggio.—p. 898; Bonnefon.—p. 903; R. Leriche and A. Policard.—p. 916.

42. **Extraction of Metal Foreign Bodies in the Skull.**—Villandre relates experiences which show that even when a foreign body seems to be causing no disturbance, radioscopy may reveal an inflammatory reaction in the depths, an abscess developing slowly and silently. In all recent wounds he advocates removal of the foreign bodies as the routine procedure, and gives illustrations of the arrangement with the radioscopic screen which permits this with the greatest safety and ease. This is the only way to protect against serious damage later, as the serious features of the wound are not so much the trauma and the mechanical injury as the infectious germs carried with the foreign body inside the skull. We can accept the rule that every scrap of metal entering the brain may bring with it germs which may set up an early meningo-encephalitis or, after a phase of more or less prolonged tolerance, there may be an abscess in the brain. Its torpid evolution will certainly prove fatal in time unless arrested by an operation. He has had twenty-nine cases of these supposed "tolerated" projectiles in the brain. No operation was attempted in seven cases, but all the others except eleven required finally operative relief for fistula, abscess, or epilepsy. In the group of eleven in which an operation was performed on general principles, without signs of mischief, in three a deep abscess was found.

43. **Ultimate Outcome of Wounds of the Skull.**—Murard reports on forty patients trephined over a year ago for war wounds of the skull. Of the twenty-one men living after an interval of from twelve to sixteen months, four have resumed active duty and three light duty; ten still complain of headache and throbbing in the skull defect. This latter group might be improved by a cartilage graft to close the gap in the skull. One of the men still has a frontal fistula. Of the four who resumed active duty, two have been fatally wounded since and the third has been wounded anew. The military regulations now order that all men trephined for war wounds of the skull are to be discharged from the service. Pure sensory disturbances disappeared early and aphasia rapidly subsided in one case. Jacksonian epilepsy also subsided promptly, but motor disturbances from deficiency, paresis and paralysis, yielded very slowly and some are not entirely gone even yet. These disturbances seem to disappear from the root of the member toward the periphery, like a garment that is being pulled off. The muscles of the limbs take the longest to recuperate. Of the twenty regarded as cured, all have resumed active life.

44. **Hernia of the Brain.**—Aigrot is convinced that hernia of the brain after a recent war wound is always the work of an infectious process which induces meningitis or suppuration and the brain tissue is forced up. The aim in treatment should be to evacuate the cyst or abscess in the depths; this is all that is necessary. The brain will then subside spontaneously into place without the necessity for lumbar puncture or compression of the hernia tissue. He gives the details of ten typical cases out of forty in which the hernia followed a few days after the war wound had been supposedly cleared out within four or five hours of the injury.

45. **Radiography of Fractured Lower Jaw.**—Japiot gives the details of sixteen cases with several illustrations, discussing the interpretation of the roentgen findings. With a war wound of the jaw the teeth may be shattered and small fragments driven in various directions. They can be differentiated from metal fragments by the absence of vibration when the electrovibrator is applied to them. Metal scraps can be felt vibrating under the finger if they are magnetic. In some of the cases illustrated the line of fracture passed through teeth still standing in place. Other typical injuries are described and the indispensable importance of roentgenoscopy is emphasized. In old cases it may reveal the causes of persisting infection and fistulas or of nonunion. He has examined nearly 1,000 cases of fracture of the lower jaw, and describes the methods found most reliable for roentgenographic examination.

46. **Paul's Tube for Operations on the Colon.**—Cumston extols the advantages of Paul's technic and the use of his glass tube in colostomy and colectomy and for all operations on the bowel for ileus with diffuse peritonitis.

47. **Secondary Resection for Suppurating War Wounds of Joints.**—Leclerc's eighteen cases of operation on the elbow for septic arthritis following a war wound of the joint gave satisfactory results in fifteen cases; he was unable to save two of the men who succumbed to septicemia, and in a third case the arm had to be amputated. In eleven of the other cases the joint is stiff now, a year later, but in a good position; two have a flail joint left; one recovered almost complete use of the elbow and one actually complete restoration of function. The septic phenomena were arrested within ten days at most. In some of the cases arthrotomy had already been done without getting rid of the infection.

48. **Resection of Bone for Muscular Retraction.**—Thévenet describes two cases of cicatricial retraction of the muscles of the forearm or of the thumb in which he restored the use of the hand by resecting the whole wrist in the first and resecting the head of the first metacarpal bone in the second case. He gives the reasons for his selection of these operations on the skeleton, the outcome confirming the correctness of his premises.

49. **Ankylosis of the Elbow.**—Thévenet treated two men with complete bony ankylosis by secondary resection of the joint as he describes in detail. The functional results were excellent; nearly all the active movements of the joint were regained. In two other cases the ankylosis was of the fibrous type and he mobilized the joint under general anesthesia. Although it was done with great gentleness, infection flared up anew in each case. One of the men was then treated by resection, with fairly good functional results.

50. **Osteochondritis Following Pleurotomy.**—Thévenet reports a case of very serious and extensive serpiginous osteochondritis of the ribs consecutive to pleurotomy for purulent pleurisy at which one rib was resected. In the course of the two following years the man had to have nine operations performed on the ribs and costal cartilages but there has been no sign of further trouble since the last operation in May, 1917. The pleurisy was on the right side but the osteochondritis gradually involved both sides.

52. **Autoplastic Nerve Grafting.**—Ingebrigtsen operated on the ulnar nerve to release it from cicatricial pressure causing intense pain, fourteen months after a war wound of the arm. This relieved the pain for two months, when it returned. A second liberation of the nerve gave only transient relief, the pains then returning, with a tendency to paresis. A stretch of 4 cm. long of the nerve was then resected and the gap bridged with a stretch 8 cm. long taken from the internal superficial brachial nerve where it emerged from the axilla. This was cut in two; thus doubled, the nerve graft was sutured to bridge the gap in the ulnar nerve. It was sutured with silk greased with petrolatum, but the whole length of the graft lay in fibrous tissue, the sequels of the preceding injury and operations. The conditions were not favorable for recuperation, and the patient returned five months later with pains and paralysis, compelling the resection of the graft. The microscopic findings in the graft are reproduced. The case confirms that white petrolatum around the suture seems to prevent the development of adhesions. The old neuritis and the other conditions interfered with the success in this case. In his forty operations on peripheral nerves, a graft was found necessary only in four cases.

52. **Graft of Dog Sciatic Nerve.**—Le Jemtel relates that a young housemaid cut her wrist, severing the arteries and nerves as well as the tendons. After long suppuration the wound healed, but trophic disturbances developed like those of mal perforans. Gangrene seemed imminent but was warded off by bridging the gap in both the median and ulnar nerves with a strip, 12 cm. long, taken from the sciatic nerve of a dog, and cut across, each gap being thus bridged with a section 6 cm. long. During the suturing the field of operation was kept constantly irrigated with warm saline. No attempt was made to suture the retracted tendons. Within a few days the trophic disturbances subsided and approximately normal conditions were restored, as also in the sensory sphere, but the motor disturbance was not improved. A year later the hand was of nearly normal aspect but retracted in a claw shape. This permitted objects to be lifted, pushed, carried and even grasped, and a weight of 11 pounds could be lifted.

52. **Grafted Aponeurosis.**—Greggio presents a second communication on his successful grafts of aponeurosis tissue in dogs. When the animals were killed, from one to over two years afterward, the grafts were found fully vitalized and vascularized, with no signs of absorption or degeneracy.

52. **Grafts of the Cornea.**—Bonnefon declares that microscopic control of the fate of grafts is very discouraging as it shows that the graft is always substituted, regenerated. It loses its physiologic personality, all except the epithelial coat. This at least has been his experience with grafts of the cornea in animals. His six years of experimental work in this line have demonstrated that experimental grafts are successful because they are regenerated from the surrounding transparent cornea. Clinical grafts are not made on the sound cornea but on degenerated, cicatricial tissue and hence active regeneration cannot be depended on. All transplantation and grafting work must be based on the elementary biologic laws which govern survival and regeneration. These old biologic laws defy all the progress in technic.

52. **Fate of Cartilage Grafts.**—Leriche and Policard examined under the microscope scraps of cartilage which had been implanted to close a gap in the skull thirty-six days and nearly a year before. They found that the cartilage proper was substituted by connective tissue, only the connective tissue part of the graft retaining its vitality and personality. Their findings emphasize anew the importance of always retaining on the graft its peripheral coat, the periosteum or perichondrium.

### Paris Médical

Dec. 22, 1917, 7, No. 51

53 *Hysteria as an Element in Contracture of the Hands. (Mains figées.) J. Boisseau and M. D'Oelsnitz.—p. 501.
54 *Swollen Calf after War Wound. R. Grégoire and Marsan.—p. 506.
55 *Spinal Anesthesia. H. Meuriot and O. Platon.—p. 508.
56 *Classification of Heart Disease. A. Leclercq.—p. 511.

53. **Contracture of the Hand Cured by Suggestion.**—Boisseau and D'Oelsnitz refer to cases of contracture or paralysis in soldiers with or without organic lesions. They have had 108 cases of the kind in which the contracture had lasted from one to eighteen months in 63 and from eighteen to thirty-six months in 45. The contracture was of the "accoucheur's hand" or the "priest blessing" type in many, and was usually

of a type that can be reproduced at will. These and other features of the cases convinced them that the motor element in the affection was of hysteric or—as they prefer to call it—of pithiatic origin and hence susceptible of being cured by psychotherapy. They prepared the men for the treatment by keeping them in a circle of already cured cases, thus impressing on them the possibility of a cure. Then the application of systematic psychotherapy resulted in a sudden and complete cure of the motor element in 71 cases; in 17 cases the cure was rapid and complete, while it took some time for the complete cure in 14 cases. The psychotherapy failed completely in only 6 cases, and in all these there was no concomitant organic lesion. Of course the long disuse of the muscles took longer before normal conditions were restored but the abrupt overcoming of the long contracture confirmed the pithiatic nature of the contracture or paralysis.

54. **Treatment of Swollen Calf after War Wounds.**—Grégoire describes a technic for releasing the muscles, especially the soleus, when the calf becomes hard and painful after a war wound of the leg. These "gros mollets," he says, have been the terror of surgeons during the war, but they are easily warded off by detaching the soleus from its points of attachment to the tibia, incising the muscle fibers close to the bone. This provides ample drainage and opens up the focus of fracture or gas gangrene.

55. **Spinal Anesthesia.**—Meuriot and Platon expatiate on the advantages of the spinal technic in operating on the legs and especially on the pelvis when the patient has to lie face downward. The war has led to the adoption of this technic more and more; Pauchet now has a record of over 2,000 operations done with spinal anesthesia, and they prefer the latter for all operations below the tenth pair of dorsal nerves. There is no vomiting with it, as they apply it, and no period of agitation as the patient rouses. The latter feature is particularly advantageous when a cast has to be applied and we have to wait for the plaster to set. Of course the anesthetic is a poison, and those whose liver and kidneys show that they are unable to counteract the toxic effect of the anesthetic should be excluded from spinal anesthesia. The wounded in war, however, are generally young and in good health, and hence evidence of toxic action from the anesthetic is very rare. They encountered it only in three of their 240 cases, and the manifestations were slight and transient. Two in this group of three were officers over 50, and the other showed signs of insufficiency on the part of the liver. In peace times, little attention was paid to insufficiency of the liver and kidneys as contraindicating spinal anesthesia and this explains the dissatisfaction with it. In operations on women soon after and during pregnancy and in persons over 50 the liver is apt to be below par. Even with the healthy young men of the army there are liable to be symptoms showing secondary excessive pressure (vertigo and headache) or indicating slight toxic action on the bulb (cold sweat, vomiting, syncope). But it is possible to ward off all this by care to withdraw enough of the cerebrospinal fluid to reduce the pressure. This may be estimated without an instrument of precision, but with the manometer it can be accurately determined, and the spinal anesthesia can proceed without fear of hypertension. They always make the injection with the patient seated, and they wait for three or four minutes before they let him recline, thus giving the anesthetic time to settle on the lower roots, and when he reclines they keep the head and shoulders raised on pillows to prevent diffusion of the drug to the brain. They always use the same solution, 0.07 gm. stovain in 2 c.c. of artificial serum, and draw 1 or 2 c.c. of the spinal fluid into the syringe and mix it well until the stovain acts on the albumin in the spinal fluid, as showed by slight turbidity.

56. **Classification of Heart Disease.**—Leclercq points out the simplification of indications in heart disease if we class the cases as those with cardiosclerosis, with cardio-arteritis, or with cardio-atheroma. Sclerosis of the heart and aorta indicates a grave outlook, with complications from hypertension and impermeability of the kidney. Treatment aims to aid in the elimination of toxins. In the cardio-arteritis group, the prognosis depends on the infectious cause responsible for the inflammation, mostly rheumatism or syphilis, and treatment should be directed to this cause and to the ultimate asystoly. In the atheroma cases, the prognosis depends on the slow poisoning of the system from lead, tobacco or alcohol, or on senile changes. Treatment here should be addressed to the poisoning or should be restricted to simplifying the diet and mode of life to conform to the reduced functional capacity of the heart and kidneys. This classification according to the physiopathology corresponds much better to clinical experience and desiderata than the classification of the textbooks, as it not only identifies etiologically, anatomically and clinically each case encountered, but furthermore indicates the proper treatment and lifts the curtain before the future.

## Presse Médicale, Paris

Dec. 17, 1917, **25**, No. 70

57 *Exposure of Large Vessels in the Nates. J. Fiolle and J. Delmas.—p. 709.
58 *Endocarditis with Slow Course. R. Debré.—p. 710.
59 *Technic for the Wassermann Test. A. D. Ronchese.—p. 712.
60 *Early Mechanotherapy for the Wounded. J. Amieux.—p. 716.

Dec. 20, 1917, **25**, No. 71

61 *The Teratogenous Influence of Attempts at Abortion. Mme. N. Wilbouchewitch.—p. 721.
62 *Cartilage Grafts for Skull Defects. G. Rouhier.—p. 722.

57. **Exposure of the Trunk Vessels in the Buttocks.**—Fiolle and Delmas comment on the difficulty of access to the gluteal, sciatic and internal pudic arteries owing to the size of the gluteus maximus. By a technic described with illustrations they show how it is possible to push this muscle to one side without cutting it. The incision in the skin runs from the center of the outer aspect of the greater trochanter, three fingerbreadths below its upper edge, straight up to this edge and 2 cm. above. Then it curves gently upward and inward, toward the posterior superior iliac spine, stopping 2 cm. short of it. The aponeurosis is then slit lengthwise along the outer margin of the greater trochanter, and the gluteus maximus is drawn aside and inward with a broad retractor. This leaves all the important vessels and nerves amply exposed to view.

58. **Slow Endocarditis.**—Debré discusses the differential diagnosis, stressing the insidious and progressive onset; the patient tires easily, grows pale and weak and has pains in the joints and periods of fever. Later there are eruptions or purpura, or there may be what seems to be a false felon on a finger, and the spleen becomes enlarged with phases of exacerbation and pain, and streptococci may be found in the blood. Periods of aggravation and remission of the symptoms alternate during months and the end comes suddenly from embolism. Sodium salicylate has no effect. Malignant endocarditis affects mostly children, while the slow form attacks adults. No benefit from any treatment to date has been recorded, but there is a possibility that specific serotherapy may yet offer better chances for success.

59. **Modified Technic for the Wassermann Test.**—Ronchese says that the technic he uses combines all the advantages of the nonheated serum with the precision of the heated serum technic. He uses an antihuman hemolytic system, with the proper dose of antihuman sensitizer calculated for the special complement. Tables giving comparative findings with other technics are appended to sustain his claims.

60. **Motor for Exercising the Legs in Bed.**—Amieux illustrates a simple motor of one-sixth horse power that serves for gentle graduated exercise of the legs before the wounded man is able to get up from bed.

61. **Congenital Deformity Traceable to Efforts for Abortion.**—Five cases are described in which healthy parents with one or more healthy children have had a child born with deformities of different kinds, or idiot or epileptic, and the mother confessed that she "did everything to arrest the pregnancy." The author asserts that the product of some toxic or traumatic procedure to induce abortion may be the first of a series transmitting the defects to the descendants. This chapter of pathologic histology of the embryo has been studied on animals but not in the human species to date.

62. **Cartilage Grafts for Skull Defects.**—Rouhier declares that the results have been constantly favorable to date in the thirty-four cases in which he has closed a gap in the skull with a graft taken from the costal cartilage, utilizing the broad sheet formed by the blending of the cartilages from the sixth rib downward. The graft is slightly concave on the under side, and he cuts out a wedge in the top center to insure a hinge-like adaptation of the graft to the curve of the skull. The article is illustrated. Local anesthesia is necessary. The graft heals in place in three weeks and the skull feels and looks solid.

### Progrès Médical, Paris

Dec. 15, 1917, **32**, No. 50

63 *The Temperature, Pulse and Respiration Curve in the Gassed. P. Voivenel and P. Martin.—p. 433.
64 *The Chassis Dressing. A. Chalier and F. Benoist.—p. 436.

Dec. 22, 1917, **32**, No. 51

65 The Mental and Nervous Phenomena that Follow Shell and Other Shocks in War. H. Damaye.—p. 441.
66 Surgical Notes. A. Aimes.—p. 444.

Dec. 29, 1917, **32**, No. 52

67 *The Eye after Vaccination against Typhoid. E. Ginestous.—p. 449.
68 Suppurating Mediastinitis: Posterior Thoracotomy. J. Guyot and Cassard.—p. 450.

63. **Asphyxia from War Gases.**—Voivenel and Martin report extensive experience with three types of gases, and comment on the different types of reaction observed to their toxic effects at different times. The composition of the gas may differ, but the condition of the men, whether intensely exhausted or fresh at the time, has some effect in modifying the clinical picture. The triple curve of the temperature, the pulse and the respiration gave an almost identical chart in all the cases that terminated fatally. In the group of the more serious cases the charts were almost identical for all, while the charts in the mild cases had similar characteristic features. The treatment found most effectual was with subcutaneous injection of 0.05 gm. sodium cacodylate, or 0.05 gm. spartein sulphate or 0.001 gm. strychnin sulphate. The injections were kept up daily for a week. The benefit was prompt and pronounced, and kept up after treatment was suspended. The experiences related confirm the extraordinary susceptibility of the gassed to fatigue and chilling. Even changing from one room to another sent the temperature up. When the triple curve of temperature, pulse and respiration constantly rose, the men all died the first or second day.

64. **The Chassis Dressing.**—Chalier and Benoist call attention anew to their method of dressing wounds which offers a number of advantages. Two years of experience with it have convinced them more and more of its superiority. Four rolls of cotton are wrapped in gauze and laid around the wound without touching it. On this square elastic frame is placed a sheet of glass, flat or convex, and the whole is fastened in place with strips of gauze or adhesive plaster. Nothing touches the wounded tissues, while they are constantly open to the eye and the course of the lesion can thus be inspected from day to day, and the dressing changed without touching the wound proper.

67. **Eye Disturbances after Vaccination against Typhoid.**—Ginestous reports two cases in which vision declined after antityphoid vaccination and the men incriminated the vaccination. Further investigation, however, revealed preexisting albuminuric retinitis in one case and in the other toxic amblyopia from abuse of tobacco to which the man was not accustomed. A third case realized the possibility mentioned recently by several writers that the temperature reaction to the vaccination might induce a febrile herpes, and that this herpes might settle on the cornea. This was what occurred in this case; two days after the fourth injection double keratoconjunctivitis developed. In less than a month there were miliary abscesses in the right cornea and a large ulceration in the left cornea with perforation. The lesions healed leaving perfect vision in the right eye, but in the left there is central leukoma and vision is only 1:50. These herpetic complications are rare, but their connection with the antityphoid vaccination can be accepted, he says.

### Gazzetta degli Ospedali e delle Cliniche, Milan

Dec. 13, 1917, **38**, No. 99

69 Preventive Vaccination. F. Pancrazio.—p. 1306.

Dec. 16, 1917, **38**, No. 100

70 *Projectiles in the Pleural Cavity. G. Ceresole.—p. 1315.
71 Trachoma in Italy. T. di Giuseppe.—p. 1316.
72 Medical Ethics during the War. E. Villa.—p. 1327.

70. **Projectiles in the Pleural Cavity.**—Ceresole comments on the difference in the symptoms with different shaped projectiles. When the missile has a rough or jagged surface it is liable to set up an aseptic inflammation with final encapsulation of the foreign body. Nothing of this kind occurs with a smooth aseptic foreign body in the pleural cavity.

### Policlinico, Rome

Dec. 16, 1917, **24**, No. 51

73 Diseases with Convulsions in the Base Hospitals. F. Bonola.—p. 1481.
74 Keeping Count of the Sponges. (Apparecchio conta-pannilini.) L. de Gaetano.—p. 1487.
75 Prophylaxis of Malaria. M. Andreotti.—p. 1492.

### Rivista de Clinica Pediatrica, Florence

December, 1917, **15**, No. 12

76 *Otitis Complicating Pleural Empyema in Children. L. Notari.—p. 617.

76. **Otitis with Pleural Empyema in Children.**—Notari has encountered seven cases of this kind, and has compiled statistics showing the relative frequency of otitis with infectious diseases in children. Smaniotto found evidences of suppurative otitis in 80 per cent. of the infant cadavers examined; Hassolauer, in 62 per cent. of the infants with infectious diseases; Teichmann in 50 per cent. of 268 children with disease of the respiratory apparatus; Rasch in 99 per cent. of children with pneumonia. Other figures confirm the great prevalence in the younger children. Notari found only five cases on record in which the otitis followed empyema. In these and in his own cases the otitis was always on the same side as the empyema. The germs probably are forced up into the ear by the mechanical impulse of coughing, sneezing or blowing the nose. It is possible that a badly managed nose douche might force air and germs with it up into the ear. The child lies generally on the diseased side even after the operation for the empyema, and this also favors the ascent of germs. His patients were three infants of from 12 to 25 months and four children from 3 to 7. All the children recovered after costotomy, and the discharge from the ear soon subsided in all. The staphylococcus was found in one case; the pneumococcus in five others.

### Brazil-Medico, Rio de Janeiro

Nov. 27, 1917, **31**, No. 47

77 Venous Hypertrophic Cirrhosis of the Liver. C. Fonte.—p. 401.

Dec. 1, 1917, **31**, No. 48

78 *Rational Treatment of Yellow Fever. H. de B. Aragão.—p. 409.
79 Giant Big Toe. (Hallomegalia escaphoide.) A. F. de Magalhães.—p. 411.

78. **Yellow Fever and Epidemic Jaundice.**—Aragão expatiates on the many points of analogy between yellow fever and epidemic jaundice, and the frequent coexistence of the two diseases when the former was prevailing. The nervous system seems depressed in both and the heart weak; in yellow fever, death occurs commonly between the sixth and tenth day, in epidemic jaundice between the eighth and the sixteenth, although the mortality with the latter is small. In yellow fever the germ is not found in the blood after the third day, and consequently drugs to act effectually on it in the blood must be given within the first three days. The resemblance between yellow fever and infectious jaundice suggests that the treatment found effectual in the latter might cure yellow fever. Hence he advises salvarsan or its substitutes given in large doses during the first three days of yellow fever, never less than 50 or 60 cg. of salvarsan. By thus striking hard and promptly, the germs will be annihilated before the danger phase has been reached.

### Gaceta Medica de Caracas

Oct. 15, 1917, 24, No. 19

80 Pituitary Extract in Obstetrics. Razetti.—p. 175.
81 *Forms of Leishmaniosis in Venezuela. G. Rincones.—p. 176.
82 Pyramidon by the Subcutaneous Route. A. Machado.—p. 177.
83 *Induced Pneumothorax. A. Larralde.—p. 179.
84 Sodium Cacodylate in Treatment of Amebic Dysentery. J. E. Montes.—p. 184. To be continued.

81. **Various Forms of Leishmaniosis in Venezuela.**—Rincones quotes Darling's statement that leishman granuloma seems to be restricted to those regions where there are laboratory facilities capable of detecting the leishman bodies. No case of ulcerating leishmaniosis has been reported to date in Venezuela, but it is possible that the leishman bodies may be responsible for certain cases of supposed rebellious malaria with enlargement of the spleen. In certain localities, Ortiz, for instance, a form of chronic ulcer is endemic, and it completely cripples a large proportion of the inhabitants. It is possible that iptravenous injections of tartar emetic might ward off or cure these cutaneous lesions. He also suggests the possible leishman nature of another ulcerating lesion, generally on the face, started by the bite of the *pito*, a kind of beetle. Still another form of probable leishmaniosis encountered in Venezuela is similar to the espundea of Brazil; the lesions do not ulcerate.

83. **Induced Pneumothorax.**—Larralde reports that in eighteen of the sixty-eight cases in which he induced an artificial pneumothorax, the patients have been entirely free from symptoms of all kinds during the interval since, up to two and a half years in some. In another group of eighteen the improvement was marked and durable. In four cases no improvement was apparent; in thirteen it proved impossible to make the pneumothorax effectual, and in seven the conditions were found so grave that this method of treatment was abandoned. In eight cases nothwithstanding the improvement in certain areas the disease continued its course to a fatal termination. With no other measures would it have been possible to arrest thus the course of the disease in so many of these febrile progressing cases of acute tuberculosis with extensive infiltrations and cavities. His experience has convinced him more and more that, done cautiously the procedure is harmless while it is the most effectual measure at our disposal for treatment of pulmonary tuberculosis.

### Semana Medica, Buenos Aires

Oct. 11, 1917, 24, No. 41

85 *Mountain Environment and the Brain. J. A. Lopez.—p. 407.
86 *The Charitable Institutions of Buenos Aires. E. R. Coni.—p. 412. Continuation.
87 Antiphagin Treatment of Tuberculosis. G. Escobar.—p. 424.

Oct. 18, 1917, 24, No. 42

88 *Development of Schoolchildren. L. R. Cassinelli.—p. 437.
89 *Tuberculin Treatment of Tuberculosis. A. Cetrangolo.—p. 442
90 Color Reactions of Fluorene with Different Aldehyds. L. Guglialmelli, and A. Delmon.—p. 456.
91 *Tramps. E. M. Martinez.—p. 458.

85. **Influence of Rarefied Air on the Intelligence.**—Lopez made a number of tests on a troop of cavalry during a series of encampments among the Andes mountains. The highest camp was 3,672 meters above the level of the sea. The maximal and minimal blood pressure is tabulated, with other findings. The psychic functions, the intelligent response to various tests, showed no change from the average elsewhere, so that from a military point of view rarefied air does not affect the efficiency of the troops.

86. **The Charitable and Welfare Work Institutions of Buenos Aires.**—In these instalments of his long work on *Buenos Aires caritativo y previsor*, Coni describes the extensive provisions for foundlings, orphans and other wards of the state.

88. **The Development of the Schoolchild.**—Cassinelli is medical inspector for the National Board of Education, and he here relates some of his impressions from data collected during many years of this service. He noted for instance that on an average the children grew taller during the summer while the weight remained stationary; in the winter they increased in weight while there was comparatively little change in height. He gives a table showing the average height and weight of girls and boys, with various other measurements, especially the diameter from shoulder to shoulder and the anterior-posterior diameter. The figures given are the average of 10,000 Argentine children between 6 and 14. The girls weigh the most, and up to 13 are taller. The chest diameters are also constantly larger in the girls, but the spirometer tests gave much higher figures for the boys at 12 and over. The vital capacity as shown by the spirometer, was 800 c.c. (Barnes spirometer) at 6 and 3,000 at 14 among the boys; in the girls, from 820 to 2,500. Muscular strength as shown by the dynamometer gave 5.5 up to 29.26 for the boys from 6 to 14; for the girls, 5.5 to 22.22 at 14. He gives further the findings with the Binet tests at different ages showing the normal standards for the age. He protests against the practice common in Argentina of building huge expensive structures for schools without due provision for playgrounds, etc., urging that the "example of the great *Republica del Norte* be followed where a school can be founded in twenty-four hours as is done in New York, Chicago, Philadelphia, etc."

89. **Tuberculin Treatment of Tuberculosis.**—Cetrangolo is the physician in charge of the national sanatorium for the tuberculous, and his experience confirms the assumption that the tubercle bacilli entering the air passages usually locate first at the base of the lung, near the bronchi, and not at the apex. The right base is generally the site of the lesion, on account of the readier access, and the bacilli pass thence to the environing glands and slumber there until something happens to reduce the resisting powers. Then they sally forth to overcome the organism. The tuberculin reaction merely indicates that the bacilli have found lodgment in the body. What we need to know is whether the bacilli are getting the upper hand or not. This we can ascertain by Viton's method of therapeutic administration of tuberculin, as described in THE JOURNAL, March 24, 1917, p. 946. He gives minute doses and calls this the vaccine diagnosis and therapy of tuberculosis. Cetrangolo is convinced that tuberculin to be truly effectual must be given in very small doses. His patients do not do so well when the larger doses are reached. With the minute doses the indications for tuberculin treatment are enlarged. He gives five temperature charts showing the regulating effect on the temperature of these small doses at three or four day intervals. The dose he uses is a 1 per cent. dilution of No. 1 of the Denys-Dessy series.

91. **The Tramp from the Psychiatric Standpoint.**—Martinez is physician to the prisons of Granada, Spain, and he describes the three main types of vagabonds, the psychopathic, the degenerate with anomalies of various kinds, and the causal type, the latter including those tramping from lack of employment or emigrants, and the voluntary tramps.

### Siglo Medico, Madrid

Nov. 24, 1917, 64, No. 3337

92 The Alleged Sleep Center. B. G. Alvarez.—p. 886.
93 Differentiation of Pneumonia and Appendicitis in Children. C. S. de los Terreros.—p. 887.
94 Cholelithiasis. S. Larregla.—p. 893.
95 Differentiation of Syphilitic Lesions and Herpes in Genital Region, Sicilia.—p. 896.

Dec. 1, 1917, 64, No. 3338

96 *Syphilitic Polyneuritis. E. M. Villapadierna.—p. 906.
97 Angina Pectoris. C. Calleja.—p. 910. Commenced in No. 3335, p. 849. See Abstract 92 on page 497.

96. **Syphilitic Polyneuritis.**—The pains, impotency and contracture in the legs had lasted for three years before the causal syphilis was recognized and improvement realized under treatment for syphilis.

### Nederlandsch Tijdschrift voor Geneeskunde, Amsterdam

Nov. 24, 1917, 2, No. 21

98 *State of Nourishment of Amsterdam Schoolchildren. J. Lubsen. —p. 1865.
99 *General Reduction in Weight. G. P. Frets.—p. 1880.
100 Change in Action of Ptyalin as it Ages. F. de Bruyne.—p. 1884.
101 Rapid Recovery from Bullet Wound in Lung. G. J. Colder and H. H. van der Meer.—p. 1888.

98. **Height and Weight of Amsterdam Children during the War.**—Lubsen relates that in January, 1916, the weight and height of 3,680 schoolchildren at Amsterdam were recorded,

but as there was no previous record of the kind, no comparisons were possible except with children of other countries. In January, 1917, the height and weight of a larger group, 5,064 schoolchildren, were recorded and the averages compared with those of the previous year. The data are tabulated from various points of view. They show that there has been no appreciable change in the average height and weight during this period of high war prices and consequent danger of undernourishment. One fact brought out by these data is that the children of the well-to-do are taller and weigh more when they first enter school. After the age when they first enter school the children of the poor and of the well-to-do classes all grow proportionately about the same. The poorer children in question all get one or more warm meals daily. They were supplied at first by a charity organization but later it became a municipal institution. Lubsen emphasizes the importance of the fact here brought into the limelight, namely, that the period in which the evil effects of inadequate nourishment on the growth are most pernicious is the period of early childhood, below school age. This fact should be borne in mind in estimating the damage from the restrictions entailed by the world war. He cites a number of reports on similar investigations conducted in Germany in the last two years. They show an unmistakable influence from the change in the diet although at first it seemed to be merely the using up of the reserves of fat. All the writers insist, however, that the German children look well and lively. In their appearance there is nothing to suggest undernourishment, and Lubsen quotes Chittenden's statements in regard to the physiologic adaptation to a reduction in food during the period of growth.

99. **Prevalent Loss of Weight from Undernourishment.**—As a contribution to the subject of the influence on the public health of the prevailing scarcity and high prices of food, Frets gives the figures of the weight, month by month, of 103 inmates of an asylum for chronic diseases. Many of them were able to be up and about all day and do useful work. The figures show for 1915 an increase in weight of 77.5 kilograms for the whole group. In 1916 the whole group lost 117 kilograms. In the first nine months of 1917 there was a total loss for the group of 390 kilograms. This is a loss of about 3.9 kilograms per capita since the introduction of the bread card.

### Hospitalstidende, Copenhagen

Nov. 28, 1917, 60, No. 48

102 *Precocious Puberty. K. H. Krabbe.—p. 1165.

102. **Precocious Puberty.**—Krabbe describes the case of an imbecile male child about a year old with virile development of the genitals, frequent erections and a tendency to tetany. By exclusion, the assumption of hyperplasia of the suprarenal cortex seems justified as the explanation of the anomalies in this child. Krabbe has found records of over 130 cases of precocious puberty on record. In those that came to necropsy a tumor was found in the ovaries in 4; in the testes in one; a tumor in the suprarenals in 4 boys and 6 girls; in the pineal body in 5 boys and 1 girl, and hydrocephalus in 1 case. In the total number, 48 were boys and 87 girls. Only 4 cases are known in Scandinavian literature, all but one in boys from 4 to 14. The one girl seemed to have a tumor in the pineal body, but no cause for the premature puberty in the boys could be discovered. Krabbe thinks that tumors in the pineal body and suprarenals probably cause the production of certain metabolic substances which have a stimulating action on the interstitial cells of the testicles and ovaries. But this occurs only in these pathologic conditions; the normal suprarenals and pineal body probably have no special function in this respect.

### Hygiea, Stockholm

Nov. 30, 1917, 79, No. 22

103 *Albuminuria with Jaundice. A. Höjer.—p. 1201.
104 *Alternating Irrigation of the Ear. M. Alfelt.—p. 1207.

103. **Albuminuria with Jaundice.**—Höjer disputes the generally accepted opinion that the albuminuria with jaundice is the result of the passage of bile elements into the blood. He contends that the same noxious influence responsible for the jaundice has probably acted also on the kidneys, and the albuminuria is the result of this simultaneous damage of the kidneys.

104. **Alternating Hot and Cold Ear Douches.**—Alfelt gives the details of five cases to show the benefit liable from these contrast douches in certain ear affections, catarrh with adhesions, otosclerosis and nervous deafness with or without subjective symptoms or arteriosclerosis. The hearing was more or less improved in some of the cases but the tinnitus was not modified. He rinsed the ear out first with 100 c.c. of warm water at about 42 C. (107 F.) following this at once with 5 or 10 c.c. cold water drawn directly from the hydrant. This was kept up, alternating the warm and cold water, until about a liter of the warm water had been used. The series was concluded with the warm water. The ear was then carefully dried and a cotton pledget worn for an hour. The sitting was repeated daily for four or six weeks. Sometimes fewer sittings were required. In one case of chronic adhesive catarrh in a woman of 49 with nervous deafness the stimulating influence on the cochlea was so pronounced that in three weeks the hearing had much improved, bone conduction increased, and the range of tones heard was extended both up and down, while the Rinne test kept negative. In a woman of 43 with familial otosclerosis, the hearing was materially improved in the course of three weeks and bone conduction increased. The limit for the lower tones was improved and for high tones became nearly normal. The drum membranes are normal. In one man of 60 with nervous deafness and arteriosclerosis the hearing improved a little and bone conduction became normal. In all these cases the tinnitus persisted unmodified.

### Ugeskrift for Læger, Copenhagen

Dec. 6, 1917, 79, No. 49

105 *Bladder Tumors. N. Falbing.—p. 1937.
106 *Obstetric Arm and Leg Holders. H. Wulff.—p. 1944.

Dec. 13, 1917, 79, No. 50

107 *Treatment of Abortion. S. A. Gammeltoft.—p. 1977.

105. **Electrocoagulation of Bladder Tumors.**—Falbing's experience with two cases reported here in detail confirms the advantages of application of the high frequency current in cases of nonmalignant papillomas and other tumors of the bladder. One of his patients was a woman of 73. No anesthetic was required and the bladder has behaved and looked absolutely normal during the three years to date. "Bladder papillomas are so liable to become malignant that it is as if the bearer were carrying dynamite around with him. With the high frequency current the papilloma can be obliterated as effectually as by excision while the electric treatment is simple and harmless." He hails it as a most valuable acquisition.

106. **Leg Holder for Parturients.**—A strap passing behind the neck buckles to broad wristlets and thus the arms are held up on a level with the shoulder, although the hands can be freely moved around within this range. Another strap passing over one shoulder and under the other arm buckles to two long bags which fit over foot and leg, and hold the leg flexed at the knee and thigh. Although held firmly there is no appreciable constraint as arms and legs can be moved freely within a certain range as the woman lies with the buttocks at the edge of the table or bed.

107. **Treatment of Abortion.**—Gammeltoft tabulates the details of 337 abortion cases and the outcome under the various measures applied—all in the Bispebjærg public hospital. He admits that abortion can be managed more expectantly in an institution than in the home. The principle is accepted that the uterus must be cleared out with all incomplete abortions, and the abortion curet is the best means for this purpose. With abortion under way in the first months of pregnancy, active treatment is practicable and is indicated if the patient is febrile or bleeding. With abortion after the twelfth week, it is best to strive for a spontaneous course. If intervention is indispensable, he seeks to get the cervical canal dilated to the extreme possible to attain at this stage. With disease in the ovaries or tubes, expectancy carried to its farthest extreme should be the rule.